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GUIDE FOR COMPILING A COMPREHENSIVE EMISSION INVENTORY

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The manual describes, in detail, procedures for obtaining and codifying information about air pollutant emissions from stationary and mobile sources. Automatic data processing, charts, and maps are discussed as presentation techniques, and a step-by-step description of data acquisition is provided. The system has been developed specifically for use by state and local air pollution control agencies. A uniform coding system for the data is encouraged in order that the information from one region may be compared with that from another. Detailed procedures are given concerning the information to be gathered from each source, the methods to be used to gather the information, the codes to be used to simplify the information on standard coding forms, the geographical and population information needed about the area of interest, the apportionment techniques and emission factors needed, and the methods of displaying the data.

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APPLIED TECHNOLOGY DIVISION

ENVIRONMENTAL PROTECTION AGENCY

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ABSTRACT

Detailed procedures are given for obtaining and codifying information about air pollutant emissions from stationary and mobile sources. The system has been developed specifically for use by state and local air pollution control agencies. Because of the large amount of information that must be collected, the data must be handled by ADP means.

A uniform coding system for the data is encouraged in order that the information from one region may be compared with that from another. Detailed procedures are given concerning the information to be gathered from each source, the methods to be used to gather the information, the codes to be used to simplify the information on standard coding forms, the geographical and population information needed about the area of interest, the apportionment techniques and emission factors needed, and the methods of displaying the data. The relation of state and local emission inventory systems to the EPA NED system is also explained.

Addendum to "Guide For Compiling A Comprehensive Emission Inventory" APTD-1135

1. ADDITION TO GENERAL INSTRUCTIONS FOR COMPLETING POINT SOURCE CODING FORMS (Section 4.2 new paragraph 7, page 4-4).

   Boiler, process and solid waste data for a facility should be entered on separate coding forms. Combustion data other than boiler (designated C in space 71, card 6) are to be entered with process data on the same coding form only when that combustion is an integral part of the process and the exhaust gases are commingled in the process.

2. ADDITION TO GENERAL INSTRUCTIONS FOR COMPLETING POINT SOURCE CODING FORMS (Section 4.2 new paragraph 8, page 4-4)

   When there are multiple stacks or point sources at a facility, it is preferrable to complete spaces 14 through 74 on Card No. 1 on only the first point source coding form; all other point source coding forms relating to additional points within the plant can have these spaces blank for Card No. 1.

3. ADDITIONAL DATA TO BE RECORDED ON CARD 2 OF THE POINT SOURCE CODING FORM (Section 4.4, page 4-6)

   Spaces 56 through 59 on Card 2 are to be completed whenever the exit gases from multiple point sources are discharged through a single stack. When this situation occurs, all point sources discharging into the single common stack must be numbered sequentially. Numbers in spaces 56-59 should be entered as if the following sentence were to be completed: "Emissions from point sources (56-57) through (58-59) in this facility are discharged through one single and common stack." All entries must be numerical and the ID number of the point source must be one of those multiple sources discharging through the common stack. For example, if a facility has 5 point sources and point sources 3, 4, 5 discharge into a single stack, then coding forms for points 3, 4, and 5 would have identical entries in spaces 56-59 on Card 2 of all coding forms whereas zeros would be entered in spaces 56-59 on those coding forms for point sources 1 and 2.

4. CLARIFICATION OF STACK DIAMETER CODING (Section 4.4.7, page 4-8).

   If two or more sources are served by a common stack, enter the actual diameter of the stack in spaces 37-39, Card 2 on each point source coding form.

5. CLARIFICATION OF CODINGS USED IN SPACES 23-52, CARD 3 (Section 4.5.3, page 4-11)

   A dual definition of secondary control equipment as coded on Card 3 will be used in completing the coding forms. Secondary control equipment shall mean (a) any equipment following in series another piece of control equipment designed to remove the same pollutant, or (b) a control device designed for one pollutant that affects the removal of another pollutant.

The following is offered for clarification of how to complete the point source form. When describing the intended use of the equipment, use definition (a). For example, use the primary block to describe a cyclone and the secondary block to describe a baghouse when speaking of particulate control on a cement plant. When a piece of equipment incidentally removes pollutants other than those for which it was normally intended, the code should be entered on the secondary control block on the NEDS form under the pollutant which it incidentally removes. For example, an alkaline scrubber may effectuate a removal of SO_2 even though it may primarily be intended for particulate removal. In this case, this is a "secondary" function of the equipment and will be classed as such in the SO_2 control blocks. Thus, codes should be entered in the secondary block with zero entered into the primary SO_2 block to denote the intended meaning.

6. ADDITION TO CODE LISTING USED IN CARD 4, SPACES 66-70 (Section 4.6.5, page 4-13)

Add the following numerical code to the original coding list:

Code	Description
5	Emissions calculated using a special emission factor that differs from the official EPA factor.

This addition is needed to avoid the automatic recalculations of emissions using EPA factors wherever a different emission factor is valid and justifiable.

7. ADDITION TO CODE LISTING USED IN SPACE 71 OF CARD 6 (Section 4.8.7, page 4-18).

Add the following alphabetical character to the original coding list:

Code	Description
S	Solid waste

8. CHANGE IN IPP PROCESS CODES APPENDIX A.4 (page A-30)

Under SIC 2819 (Industrial Inorganic Chemicals), process codes 10 and 11 should be renumbered to 11 and 12, respectively.

9. CHANGES IN CONTROL EQUIPMENT IDENTIFICATION CODES APPENDIX A.3 (pp. A-29 and A-30)

Equipment	Code	Action
No equipment	000	Add
No equipment	060	Delete
Flaring	023	Add
Alkalized Alumina	040	Add
Sulfuric Acid Plant - Contact Process	043	Add
Sulfuric Acid Plant - Double Contact Process	044	Add
Vapor Recovery System (including condensers, hooding, and other enclosures)	047	Add
Activated Carbon Adsorption	048	Add
Liquid Filtration System	049	Add

GUIDE FOR COMPILING A COMPREHENSIVE EMISSION INVENTORY

1. INTRODUCTION

1.1 DESCRIPTION OF AIR POLLUTANT EMISSION INVENTORY

Pollution of the atmospheric environment has come about as an undesired by-product of the technological advancement of modern society. It is imperative that man use the technology that he has developed to engineer the prevention of atmospheric emissions.

The initial step toward improving a situation is to define the problem areas. In the realm of air pollution control, a primary requirement is determination of the source of the components of air pollution. Fundamentally, this requirement is provided for by the emission inventory, which answers the pressing question, "From where does it all come?"

Identification of sources, pollutants, locations, and quantities of emissions, coupled with local meteorological and air quality data and information regarding air pollution effects, provides the basis for a plan of action for improvement of air quality. The emission inventory is therefore a vital element in the abatement of emissions.

1.2 USES OF EMISSION INVENTORY

Because it accurately defines the problem of air pollution, the emission inventory is one of the most important planning tools available to an air pollution control agency. The inventory provides information concerning source emissions and defines the location, magnitude, frequency, duration, and relative contribution of these emissions. It can be used to measure past successes and to point to future problems. An emission inventory can be used to design an air sampling network, to predict ambient air quality, to design, evaluate, or modify a control program, and, in conjunction with a permit or registration system, to provide up-to-date information on major sources of pollution.

The proper emission control strategy for a specific air pollution problem is dependent upon an adequate assessment of the nature and extent of the pollution in the region involved. This assessment includes a review of existing levels of pollutants, the sources and their emissions, the techniques available for their control, and the probable increase in source emissions resulting from urban and economic growth. The emission inventory indicates the major contributors (motor vehicle, industrial, etc.), and this information, in turn, directs the thrust of control efforts. After the control strategies have been developed, they can be tested with the aid of a diffusion simulation model or other systematic, quantitative procedures to determine which strategies are capable of bringing about acceptable air quality as defined by national or state ambient air quality standards.

If the emission inventory is updated annually, a decrease in emissions should be reflected over a period of years. This decrease would then be a measure of the effectiveness and success of the control program and could be used to indicate areas where program modification would be useful.

Likewise, in the design of an air sampling network, it is important to get maximum return in usable data for the manpower and funds invested. Information concerning the location of sources and quantities of emissions in a region may be used to indicate where the highest pollutant concentrations probably exist. This knowledge will assist the agency in locating elements of the sampling network. Samplers are normally concentrated in areas of greatest emissions. In the event that a single source is believed to be primarily responsible for degraded air quality, the sampling network may be oriented in such a way that evidence of the impact of the emissions from that particular source may be obtained.

The emission inventory may be used with sufficient supporting meteorological data to predict ambient air quality for a given locality. From emission density maps, areas with high pollutant releases can be located. A more sophisticated method of predicting air quality is diffusion simulation modeling. Included among the models in widespread use are the Air Quality Display Model (AQDM) and the Implementation Planning Program (IPP). Although the AQDM and IPP are relatively simple to use, the accuracy of results is very dependent upon the degree to which the input data represent the physical situation within the area of interest.

1.3 PURPOSE OF THIS MANUAL

The specific purpose of this manual is to describe methods of obtaining emission inventory data and of presenting the information. Automatic data processing, charts, and maps are discussed as presentation techniques, and a step-by-step description of data acquisition is provided. As more information becomes available on emission inventory techniques and as specific methodology becomes more sophisticated, updated sections of this manual will be published as supplements available from the Air Pollution Technical Information Center, EPA. Any suggestions on specification of air pollutant emission inventory details should be directed to the Chief of the National Source Inventory Section, AQMB, ATD, SSPCP, OAP, Research Triangle Park, North Carolina 27711.

2. UNIFORM SOURCE INVENTORY

2.1 NEED FOR UNIFORM SOURCE INVENTORY

Much detailed information is needed about each source of pollutants in a selected locale before an emission inventory can be computed for that area. There are several ways in which the information about each source can be collected and codified. If, however, the data from one area are to be compared with those from another, it is necessary that all the information about all the sources conform to certain conventions.

Thus, common weight units, volume units, area units, grid coordinates, etc., must be used by all the data collectors. Another reason for standardizing data recording is to facilitate automatic data processing (ADP), which will be necessary because of the enormous amount of data that will be amassed from the large number of sources nationwide.

2.2 COMPUTERIZED SYSTEM

The concept of the computerized system is shown in Figure 2-1; the data storage and identification files are shown on the left side of the diagram, and the ADP operations are indicated on the right. The system will store data for all point and area (county) sources of emissions using the identification codes listed in Appendix A, and the formats shown in Appendix B; these data will be updated periodically.

2.3 DATA FILES

The following files are used for data storage:

1. Point source file - all source information on each point source, including Federal facilities.
2. Area source file - all source information on each area (county) source.
3. Hazardous pollutants source file - all source information on each emitter of hazardous or potentially hazardous trace elements or compounds. (Emitters meeting the requirement of a defined point source also are listed in the point source file.)

Because all emission factor information is stored separately in the emission factor file, changes can be made, at any time, in the emission factor file (containing about 900 cards) without modification of the source files (containing many

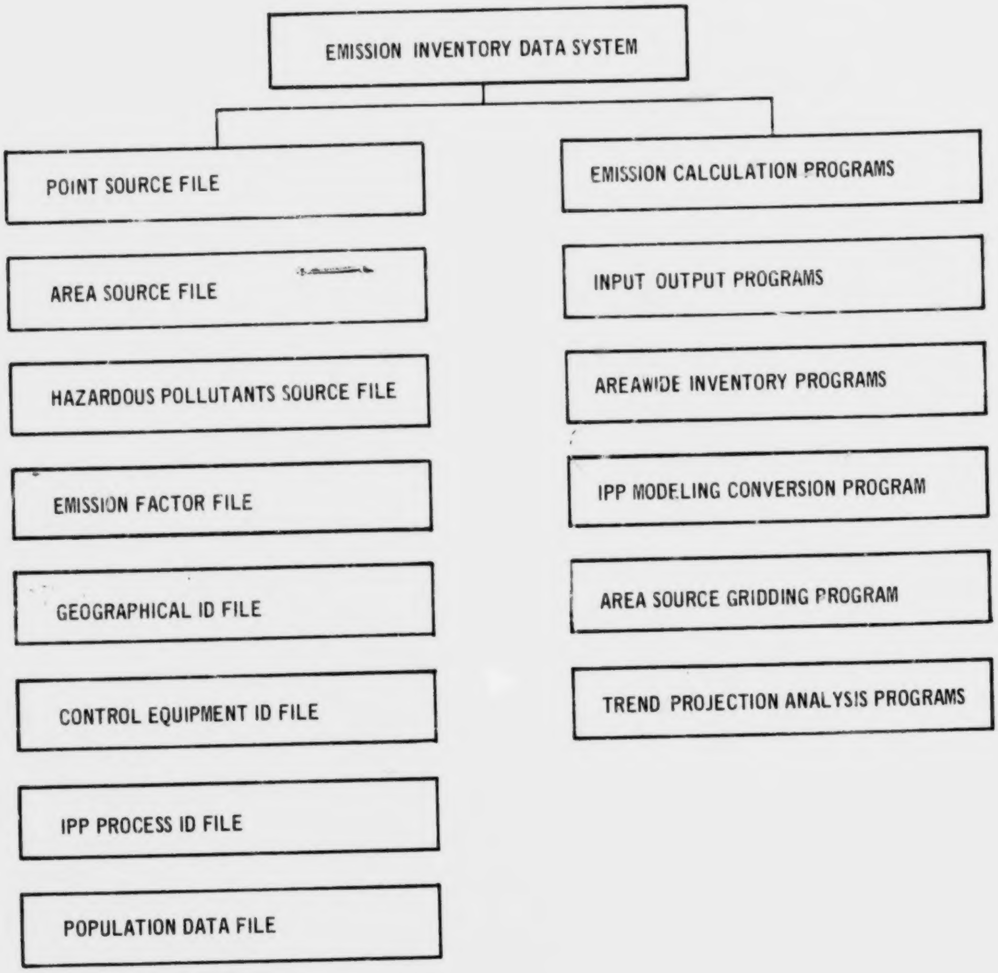
EMISSION INVENTORY DATA SYSTEM
POINT SOURCE FILE
AREA SOURCE FILE
HAZARDOUS POLLUTANTS SOURCE FILE
EMISSION FACTOR FILE
GEOGRAPHICAL ID FILE
CONTROL EQUIPMENT ID FILE
IPP PROCESS ID FILE
POPULATION DATA FILE
EMISSION CALCULATION PROGRAMS
INPUT OUTPUT PROGRAMS
AREAWIDE INVENTORY PROGRAMS
IPP MODELING CONVERSION PROGRAM
AREA SOURCE GRIDDING PROGRAM
TREND PROJECTION ANALYSIS PROGRAMS

Figure 2-1. Emission inventory system concept.

thousands). The formats for storage in the source and emission factor files are given in Appendix B, Sections 1, 2, and 3, and the Source Classification Codes (SCC's) for emission factors and units are given in Appendix A, Section 2.

2.4 IDENTIFICATION FILES

Additional data required for identification are stored in the following files:

1. Geographical identification file - all Federal regional offices, state, AQCR (Air Quality Control Region), and county names and identification numbers.
2. Control equipment identification file - all control equipment names and identification numbers.
3. IPP process identification file - all identification numbers as required in the inventory to be used in IPP modeling programs.

The formats for files 1 and 2 are given in Appendix B, Sections 4 and 5, and the actual identification numbers for files 1, 2, and 3 appear in Appendix A, Sections 1, 3, and 4.

Both projection and trend analyses require the use of extensive population data and associated information on housing, etc. If a state desires to use these analyses, the necessary information will be stored in the OAP data file on population.

2.4.1 Geographical Identification File

For the emission inventory to be used properly, emissions must be reported geographically, with point sources identified and located precisely, and area sources apportioned to specific grids. For inventories in different localities to be compatible, a uniform reporting system must be used.

For the purposes of emission inventories, as discussed in this manual, point sources are defined[1] as sources that emit at least 100 tons per year of an air pollutant and that can be pinpointed to a definite geographic location. An area source, on the other hand, is one that emits less than 100 tons per year and is apportioned over a geographic area. (It should be noted that the value of 100 tons is the one chosen by EPA; the states may, at their discretion, select smaller values that best suit their own particular problems and needs.) These definitions apply to particulates, SO_x, CO, hydrocarbons, and NO_x. Every emitter of hazardous pollutants or trace elements and compounds is considered a point source.

Various grid systems utilizing coordinate systems have been developed for locating geographical points. The three most common systems are:

1. Latitude and longitude system.

2. State plane system.
3. Universal Transverse Mercator (UTM) system.

A detailed description of these systems has been provided by the Department of the Army[2] and Deetz and Adams,[3] who give excellent backgrounds for understanding the development of coordinate systems. Because of various disadvantages of the first two systems, the third, the Universal Transverse Mercator system, was developed by the U. S. Army. In this system, instead of using the equator as the "axis of the Mercator," the U. S. Army transversed (rotated) the axis 90 degrees and used a meridian running north-south as the axis from which all measurements would be made. In this manner, a meridian at any point on the globe may be selected so that an approximately 2,000-mile-wide (15 degrees to each side of the meridian) area of unskewed map covers any part of the world.

The Universal Transverse Mercator (UTM) system was designed by the U. S. Army[4] to provide for the projection of square grid zones with convenient measuring units. The system also maximizes the distance measurable from one pair of meridians and false origins with a reasonable amount of accuracy. The globe was subdivided into 60 north-south zones, each 6 degrees wide with a central transverse Mercator. Ten of these UTM zones cover the continental United States, as indicated in Figure 2-2. The false origin for each zone in the Northern Hemisphere is 500,000 meters west of the point where its central meridian crosses the equator. Using the UTM system, grid zones may be drawn for air pollution emission inventories.

The advantages of this system are:

1. UTM grids are continuous across the country and not hindered by political subdivisions.
2. UTM grids are uniform throughout the country.
3. Grid lines are identifiable by "tick marks" on the USGS maps.
4. The system is used worldwide.
5. The system is becoming the base repository for a growing body of technical information.
6. Interstate AQCR's must have a common coordinate system.

2.4.2 Use of UTM System

USGS maps do not show UTM grid lines as they do latitude and longitude; however, tick marks along the edges of the maps do indicate the grid locations. Three basic map scales are available:

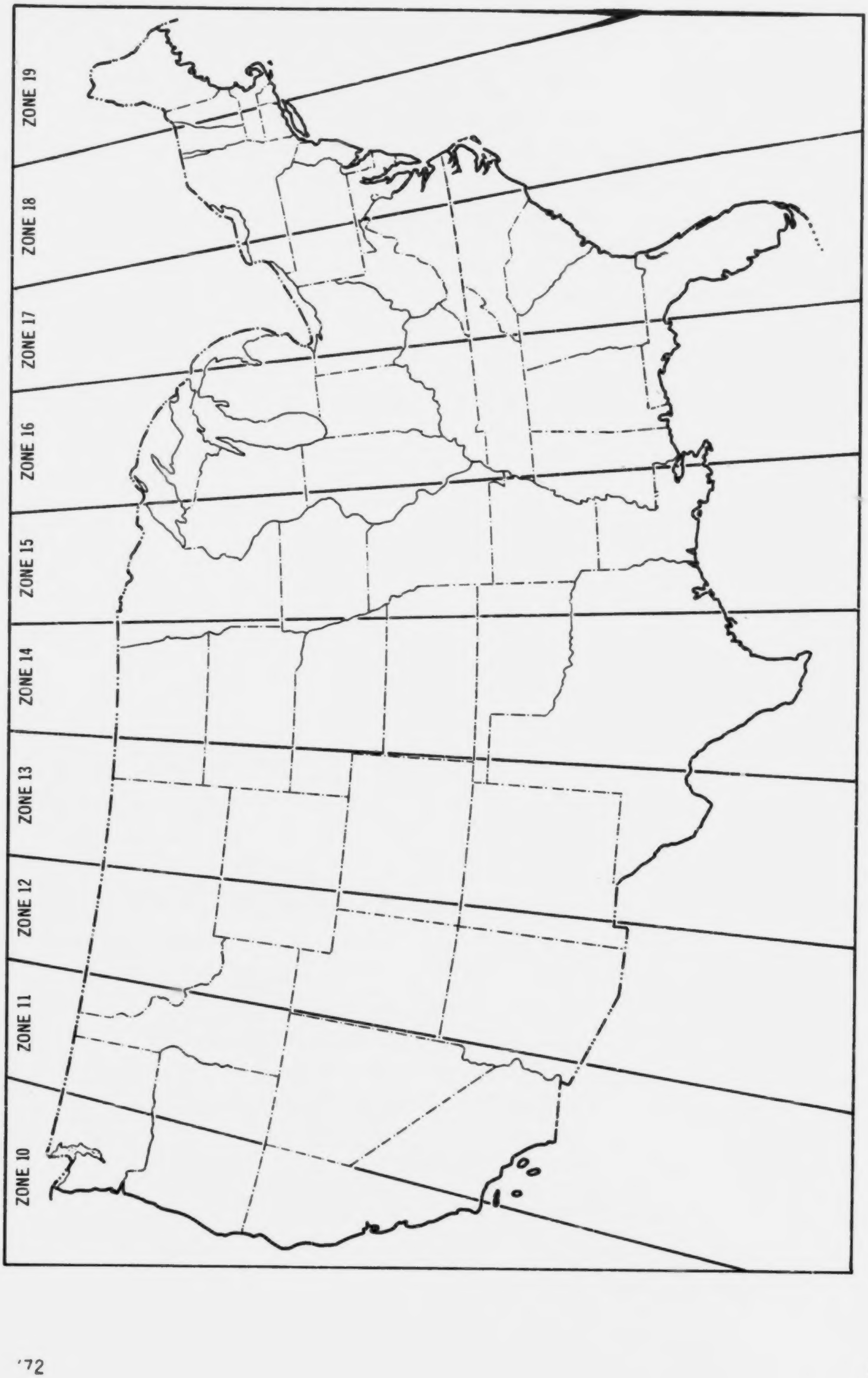
ZONE 10
ZONE 11
ZONE 12
ZONE 13
ZONE 14
ZONE 15
ZONE 16
ZONE 17
ZONE 18
ZONE 19

Figure 2–2. UTM grid zones in the contiguous United States.

1. 1:250,000.
2. 1:62,000.
3. 1:24,000.

For 1, the tick marks appear for every 10,000 meters; for 2 and 3, they appear for every 1000 meters, with every fifth tick mark giving the meter value. Also for 2 and 3, the meter values for the tick marks nearest the southeast and northwest corners of the map are given.

The 1:24,000 scale is necessary to locate point sources adequately; maps with these scales are readily available for many rural areas and for all metropolitan areas. A straight edge must be used to connect tick marks on the top and bottom of USGS maps when interpolating because the maps are drawn on the latitude-longitude system and, therefore, the UTM grids may appear quite skewed. To facilitate the reading of UTM grid coordinates and to avoid the need for visual interpolation, one should obtain translucent metric grid templates that can be used to overlay the grid zones.

The UTM zone number, which is indicated on each USGS map, must be cited to locate the coordinates properly. Figure 2-2 indicates that zones 10 through 19 encompass the 48 contiguous states; zones 1 through 9, Alaska; zones 19 and 20, Puerto Rico and the Virgin Islands; and zones 1 through 5, Hawaii. For a complete description of these zones, refer to Reference 5.

2.4.3 Air Quality Control Regions

The Office of Air Programs, EPA, has issued a publication[6] that clearly defines the boundaries of the AQCR's and lists the counties and cities in each region. Furthermore, an identification number has been assigned to each AQCR and county for automatic data processing; these identification numbers, shown in Appendix A, constitute the geographical identification file of the data system.

2.4.4 Population Data File

An emission inventory, the generation of which involves many steps, is for the purpose of ascertaining the quantity of emissions for some selected pollutants for a desired area such as county, city, or state. In this manual, particular emphasis is placed on obtaining estimates at the county level.

Because it is impossible to test all pollutant sources individually, particularly area sources, an estimating procedure must be used. In order to do this, however, one must either estimate the emissions directly or estimate the magnitude of some other variables or indicators that can then be related to emissions. These indicators include such things as fuel consumption, vehicle miles, gasoline sales, raw materials processed, and tons of refuse burned, which are then multiplied by appropriate emission factors to obtain emissions.

Some emissions, however, can be related to the number of inhabitants in an area. Perhaps the best example of this kind of emission is that occurring from solid waste disposal. Studies[7] have shown that each person generates a daily average of 10 pounds of solid waste. In this case, lacking more precise information, an estimate of tons of refuse may be obtained by applying this figure to the population of the area of interest.

The use of "population data," as this information is called, has become an inherent part of the emission inventory procedure. It is often difficult and expensive to determine fuel consumption and other indicators of pollution in areas smaller than states or SMSA's (standard metropolitan statistical areas). In such cases, it is then necessary to apportion these totals to each county or city of interest. The several ways of doing this, depending on the source category of emissions, require the use of population ratios, number of household units in an area, number of manufacturing employees, urban-rural population ratio, amount of construction, or number of retail and wholesale establishments. Without this information, it would be very difficult to obtain estimates of emissions for smaller areas.

Population data may be obtained from a variety of sources. The Bureau of Census publishes many documents containing such information; the three most valuable for inventory purposes are the census of population,[8,9] the census of housing,[10] and the census of manufacturing.[11] As the name indicates, the census of population contains official population counts for states, urban and rural residences, SMSA's, and counties. The census of housing contains detailed housing characteristics such as number of occupied dwelling units, number of rooms per structure, equipment (heating, air conditioning), and fuels used for heating and cooking. The census of manufacturing is comprised of 80 separate reports, and summary figures are provided for 422 manufacturing industries on quantity and value of goods shipped, cost of fuels and electric energy, employment, etc.

Apportionment on the basis of population data is primarily used in determining emissions from area sources. Procedures for identifying these emissions will be discussed in detail in Chapter 5. The following, however, are simplified examples of how population data can be used for this purpose if more detailed data are not available as described in Chapter 5.

If residential or commercial coal consumption for a state is known and apportionment to a specific county within the state is required, simply multiply the amount of coal for the state by the ratio of the population of the county to that of the state. This method will permit an estimate of coal consumption to be made for each county. This procedure is reasonable if the coal consumption is primarily for residential use, as would probably be true of anthracite coal. The procedure also assumes that the coal consumption is spread uniformly over the state.

In estimating industrial fuel use, apportionment is made on the basis of the number of manufacturing employees. To apportion commercial and institutional fuel quantities, use either population figures alone or a combination of population and number of retail and wholesale establishments, depending on the area under study (see Chapter 5).

Census data are also used in estimating emissions from mobile sources. It has been found that emissions vary according to the characteristics of driving: stop-and-go city driving leads to greater emissions than open-road driving.[12] It thus becomes necessary to obtain estimates of the ratio of urban to rural driving from the census of population. Sometimes it is necessary to use gasoline consumption data to estimate these emissions, in which case apportionment by the population file would be made.

2.5 AUTOMATIC DATA PROCESSING (ADP) SOFTWARE

Following the definition of storage and identification file formats, the ADP programming necessary for data storage, maintenance, manipulation, and retrieval can begin. Conceptually, some of these functions are shown in Figure 2-1 (right-hand side). These programs, which constitute the ADP software necessary to utilize the source and identification data, include:

1. Input/output programs.
2. Emission calculation programs - for use in applying emission factors to source data to obtain emissions.
3. Areawide inventory programs - for outputting data in a form suitable for reporting point and area source emissions by source classification and geographical areas.
4. IPP modeling conversion program - for selecting items of data from the source files to be used for modeling, and for outputting these items in the proper format for input to the IPP programs.
5. Area source gridding program - for apportioning the area source emissions to grids in a form suitable for input to IPP modeling.
6. Trend/projection analysis programs - for utilizing available data to ascertain trends or projections of emissions by sources and geographical areas.

The programs for these operations are currently being prepared by EPA.

2.6 UPDATING DATA FILES

Source files (point, area, and hazardous pollutants) must be continuously updated to keep the emission inventory current. Information for the update can come from permit or registration activities as well as from inspection reports. The emission factor file will also be updated continuously as new information from source testing becomes available.

2.7 REFERENCES

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3. EMISSION FACTORS

3.1 EMISSION FACTORS DEFINED

In the assessment of community and national air pollution, there is a critical need for accurate data on the quantity and characteristics of emissions from the numerous sources that contribute to the problem. The large numbers of these individual sources and their diversity make field measurements of all sources of emissions impossible. The only practical approach is to make generalized estimates of typical emissions for each of the source classifications when actual field test data are not available.

The emission factor is a quantitative estimate of the average rate at which a pollutant is released to the atmosphere as a result of some industrial activity, divided by the level of that activity. For example, assume that in the production of 260,000 tons of ammonia per year, 26,000 tons of carbon monoxide is emitted to the atmosphere. The emission factor for the production of ammonia would therefore be 200 pounds (0.1 ton) of CO released per ton of ammonia produced. The emission factor thus relates the quantity of pollutants emitted to some indicator of activity such as production capacity, quantity of fuel burned, or vehicle miles traveled.

Many techniques are available for use in determining emission factors. These techniques include detailed source testing involving many measurements related to a variety of process variables, single measurements not clearly defined as to their relationship to process operating conditions, process material balances, and engineering appraisals (estimates) of a given process.

The limitations and applicability of emission factors must be understood: in general, emission factors are not precise indicators of emissions from a single source, but are more valid when applied to a large number of sources and processes. When such limitations are taken into account, emission factors can be extremely useful in conducting source inventories as a part of community or nationwide air pollution studies.

Emission factors may be found in a number of literature sources. The most complete collection of factors has been published by the Environmental Protection Agency in AP-42, Compilation of Air Pollutant Emission Factors (revised 1972).[1]

3.2 USE OF EMISSION FACTORS

Emission factors are used in conjunction with source information gained through methods described elsewhere in this document. The information needed for area and point sources will vary. When calculating area source emissions, a generalized emission factor may be used with fuel data, vehicle miles, or other activity level to estimate the emissions. For point sources it is very important that actual data be available from questionnaires, on-site visits, telephone contacts, etc. in sufficient detail to determine which factor to use, the production factors involved, realistic estimates of control efficiencies, and any unique characteristics that might affect the emissions. It is important that the information used contain detail on minor operations, parallel or preparatory processes, and air pollutants from sources other than the main production activity. Though the emission factor procedure is simple in nature, utilization of factors cannot be entirely mechanical. Engineering knowledge and judgment are often necessary to arrive at realistic estimates. Emission factors are chosen from Compilation of Air Pollutant Emission Factors[1] and multiplied by the activity level information available; correct units must be used. This product will be the estimated emissions for the time frame in consideration (i.e., tons per day or tons per year).

3.3 CONTROL EQUIPMENT

When selecting an emission factor, care must be taken to determine whether it is an "uncontrolled" or "controlled" estimate. Most factors are presented in terms of uncontrolled or precontrolled quantities. A few source categories, however, have factors that can be used to estimate the emissions on a controlled or partially controlled basis because of the uniqueness of the process equipment or sources of data available. In those cases where a factor that takes controls into account is given, no further adjustment need be made to the emission estimate.

If the emission factor used gives the uncontrolled estimate, the factor must be adjusted to reflect effects of control equipment employed. For example, if a source has an activity level of 1000 tons production per year and the uncontrolled factor is 1 pound of particulates per ton of product, the "uncontrolled" particulate emissions would be 1000 pounds per year. If a baghouse having a 99 percent efficiency were attached to the process, then the "controlled" emissions (i.e., emissions after effects of control) would be 10 pounds of particulates per year. Thus both emission factors and control equipment effects must be considered when estimating emissions.

Efficiency of a particular control device or type of control device can vary considerably, depending upon a number of source-related variables such as particle size, pressure drop, equipment deterioration, gas concentrations, and physical and chemical characteristics of particulates. A control device for one pollutant may also affect the removal of another pollutant. This might occur, for example, when a wet scrubber, primarily for particulates, also removes some percentage of sulfur oxides. The sulfur oxide removal in this case would be termed secondary control. For these reasons it is necessary to define typical control efficiencies by pollutant for the devices used in terms of each specific process or operation. These definitions are currently being developed by EPA.

3.4 SOURCE CLASSIFICATION CODE

For the purpose of data collection, the emission factors and control equipment efficiencies have been identified by the individual process or activity that might be defined as a point source. A series of point source classification codes has been developed for those sources for which emission factors are available. Four levels of identification are used. These four levels are sufficient to define a general category, and subcategories within the general category. The subcategories define classification as to fuels, industrial processes, products, equipment types used, etc. The classification system is quite flexible, and new or revised emission factors may be added easily.

3.5 QUALITY RATINGS OF EMISSION FACTORS

Emission factor accuracy and reliability are dependent upon many variables. It is generally accepted that emission factors generated from on-site source-test data are preferred and will give more realistic estimates than those developed strictly from engineering analyses or material balances. Even the well-balanced factors at best will have an inherent variability influenced by source-test inaccuracies, material fluctuations, and age and condition of control devices.

In the past, the level of reliability of emission factors has been represented by an alphabetic code: "A" through "E," where "A" indicates a rating of "excellent." An attempt is currently underway to attach a number to this reliability. This quality factor should be integrated into the emission factor codes and should be available in such a fashion that by combining the individual quality levels and the emissions in each source category, a reliability rating for the overall emission inventory for an area may by realized. The quality ratings are indicated in Compilation of Air Pollutant Emission Factors.[1]

3.6 REFERENCE

1. Compilation of Air Pollutant Emission Factors. U. S. Environmental Protection Agency, Office of Air Programs. OAP Publication No. AP-42. Research Triangle Park, North Carolina. February 1972.

4. POINT SOURCE CODING

4.1 DESCRIPTION OF POINT SOURCE CODING FORM

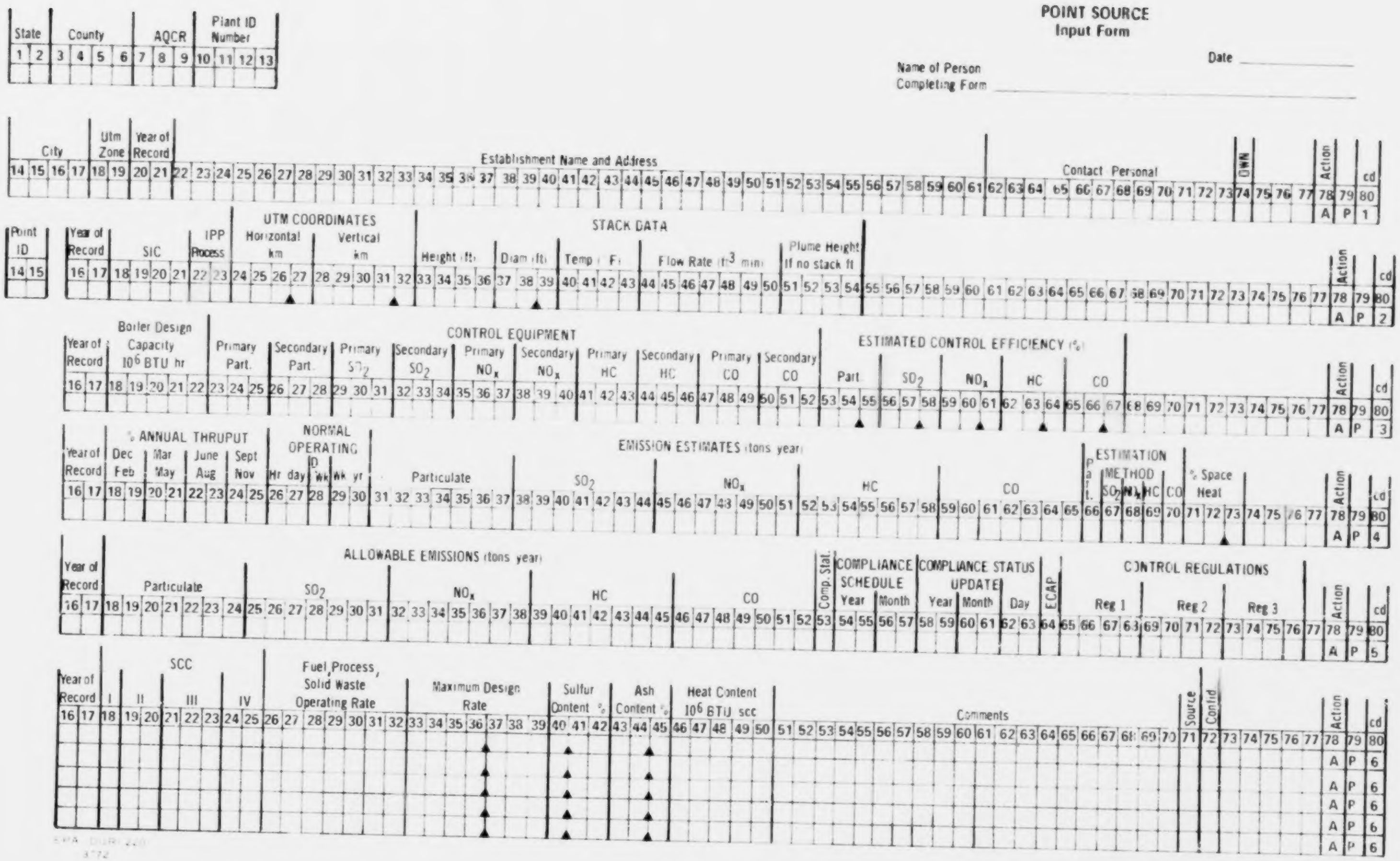
The point source coding form shown in Figure 4-1 contains space for six separate computer cards of data for each point source. At least one coding form should be completed for each facility defined as a point source. As outlined in the Federal Register, August 14, 1971 (shown in Appendix C), a point source is:

> (a) any stationary source causing emissions in excess of 100 tons per year of any pollutant for which there is a national standard in a region containing an area whose 1970 "urban place" population, as defined by the U. S. Bureau of Census, was equal to or greater than 1 million, or (b) any stationary source causing emissions in excess of 25 tons per year of any pollutant for which there is a national standard in a region containing an area whose 1970 "urban place" population, as defined by the U. S. Bureau of Census, was less than 1 million, or (c) without regard to quantity, a source as listed in Table 1, page 27 [of the August 14 Federal Register], or (d) the sources included in a comprehensive permit or registration system already maintained by the agency.

Area sources include the following: small residential, commercial, governmental, institutional, and industrial fuel combustion operations, as well as on-site waste disposal and transportation sources.

Source data required on the coding form are needed for the following reasons:

1. To locate the source geographically and to index it with respect to county, state, city, and AQCR.
2. To describe the process and operating conditions of the source along with details on air pollution control equipment and emission characteristics.
3. To automatically calculate emissions of particulates, SO_x, hydrocarbons, NO_x, and CO by means of current emission factors.
4. To provide input data for mathematically modeling the local air quality; the modeling, in turn, allows the enforcing agency to develop control strategies on a rational basis after evaluating numerous combinations of possible alternatives.
5. To ascertain the legal status of each point source in complying with current pollution control regulations (i.e., allowable emissions, compliance schedules, and variances).



POINT SOURCE
Input Form

Name of Person Completing Form ____________________

Date ______________

State	County	AQCR	Plant ID Number
1 2	3 4 5 6	7 8 9	10 11 12 13

City	Utm Zone	Year of Record	Establishment Name and Address	Contact Personal	OWN		Action		cd
14 15 16 17	18 19	20 21	22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61	62 63 64 65 66 67 68 69 70 71 72 73	74	75 76 77	78	79	80
							A	P	1

Point ID
14 15

			UTM COORDINATES		STACK DATA								
Year of Record	SIC	IPP Process	Horizontal km	Vertical km	Height (ft)	Diam (ft)	Temp (°F)	Flow Rate (ft^3/min)	Plume Height If no stack ft		Action		cd
16 17	18 19 20 21	22 23	24 25 26 27	28 29 30 31 32	33 34 35 36	37 38 39	40 41 42 43	44 45 46 47 48 49 50	51 52 53 54	55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77	78	79	80
			▲	▲		▲					A	P	2

		CONTROL EQUIPMENT										ESTIMATED CONTROL EFFICIENCY (%)								
Year of Record	Boiler Design Capacity 10^6 BTU/hr	Primary Part.	Secondary Part.	Primary SO_2	Secondary SO_2	Primary NO_x	Secondary NO_x	Primary HC	Secondary HC	Primary CO	Secondary CO	Part	SO_2	NO_x	HC	CO		Action		cd
16 17	18 19 20 21 22	23 24 25	26 27 28	29 30 31	32 33 34	35 36 37	38 39 40	41 42 43	44 45 46	47 48 49	50 51 52	53 54 55	56 57 58	59 60 61	62 63 64	65 66 67	68 69 70 71 72 73 74 75 76 77	78	79	80
												▲	▲	▲	▲	▲		A	P	3

	% ANNUAL THRUPUT				NORMAL OPERATING			EMISSION ESTIMATES (tons/year)					ESTIMATION METHOD									
Year of Record	Dec Feb	Mar May	June Aug	Sept Nov	Hr/day	D/wk	Wk/yr	Particulate	SO_2	NO_x	HC	CO	Part.	SO_2	NO_x	HC	CO	% Space Heat		Action		cd
16 17	18 19	20 21	22 23	24 25	26 27	28	29 30	31 32 33 34 35 36 37	38 39 40 41 42 43 44	45 46 47 48 49 50 51	52 53 54 55 56 57 58	59 60 61 62 63 64 65	66	67	68	69	70	71 72 73	74 75 76 77	78	79	80
																		▲		A	P	4

	ALLOWABLE EMISSIONS (tons/year)						COMPLIANCE SCHEDULE		COMPLIANCE STATUS UPDATE				CONTROL REGULATIONS						
Year of Record	Particulate	SO_2	NO_x	HC	CO	Comp. Stat.	Year	Month	Year	Month	Day	ECAP	Reg 1	Reg 2	Reg 3		Action		cd
16 17	18 19 20 21 22 23 24	25 26 27 28 29 30 31	32 33 34 35 36 37 38	39 40 41 42 43 44 45	46 47 48 49 50 51 52	53	54 55	56 57	58 59	60 61	62 63	64	65 66 67 68	69 70 71 72	73 74 75 76	77	78	79	80
																	A	P	5

	SCC														
Year of Record	I	II	III	IV	Fuel, Process, Solid Waste Operating Rate	Maximum Design Rate	Sulfur Content %	Ash Content %	Heat Content 10^6 BTU/scc	Comments	Source	Confid		Action		cd
16 17	18	19 20	21 22 23	24 25	26 27 28 29 30 31 32	33 34 35 36 37 38 39	40 41 42	43 44 45	46 47 48 49 50	51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70	71	72	73 74 75 76 77	78	79	80
						▲	▲	▲						A	P	6
						▲	▲	▲						A	P	6
						▲	▲	▲						A	P	6
						▲	▲	▲						A	P	6
						▲	▲	▲						A	P	6

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Figure 4-1. Point source coding form.

The layout of the six cards on the coding form is such that data least likely to change are on the first cards, and data most likely to change are on the last cards at the bottom of the coding form. This arrangement allows updating the point source data at a later time without unnecessarily rewriting the entire coding form. Moreover, the system is designed to facilitate the collection and recording of any additional data on the point sources that may be required in the future. Such expansion as the need arises is necessary in compiling a comprehensive inventory.

4.2 INSTRUCTIONS FOR COMPLETING POINT SOURCE CODING FORM

Certain instructions that apply to the entire form include the following:

1. Zeros are treated either as numbers or to indicate fields that are nonapplicable; blank spaces in a field indicate a lack of data. This means that the system separates items that are either numerically zero or not applicable from those that are unknown. If a field is nonapplicable, then only one zero need be tabulated in the right-justified columns of the field.
2. Only specified alphabetical or numerical characters are allowed to be entered in the columns. No unusual marks are to be made in the spaces. This rule prevents unnecessary keypunching errors in processing the forms.
3. Only the allowed coding values may be entered in columns that require coding symbols. The coding lists may be expanded as needed from time to time.
4. Instructions for filling out each card on the form are quite specific and were designed to apply to the large majority of point sources. Nevertheless, it is recognized that assumptions must occasionally be made to reflect the real, physical situation at an unusual point source. Care should be taken to make reasonable assumptions that most nearly correspond to the true circumstances at the point source.
5. Any boiler emitting over 100 tons per year of any one pollutant should be considered a separate and individual point source. For example, if two or more such boilers at a facility discharge gases into one smokestack, then two (or more) coding forms should be completed and the exit-gas flow rates corresponding to each boiler should be entered on the proper coding form. In this case, the UTM coordinates entered on both forms will be identical.
6. If a plant or facility has several emitting sources adjacent to each other and the sum of emissions from all sources within the facility is greater than 100 tons per year, then these emitting points should be reported on

coding forms. For example, if a plant has four adjacent stacks, each of which emits 75 tons of SO_2 per year, then the facility emits 4 times 75, or 300 tons, of SO_2 per year and should be reported on the coding forms. On the other hand, if each smokestack contributes 20 tons of SO_2 per year, then the total facility emissions are 4 times 20, or 80 tons, per year, and a coding form need not be completed for the facility, unless the agency has expanded its inventory to include sources that emit less than 100 tons of pollutant per year.

Detailed instructions are given below for completing each card in the coding form. It should be noted that special coding lists are required when "numerical code" or "alphabetical code" appears in the column headed "Symbol."

4.3 IDENTIFICATION AND LOCATION OF POINT SOURCES

Card 1 - General Facility Identification

Spaces	Format	Symbol	Description	Unit
1-2	XX	Numerical Code	State Coding Number	-
3-6	XXXX	Numerical Code	County Coding Number	-
7-9	XXX	Numerical Code	AQCR Number	-
10-13	XXXX	Numerical Code	Source Number Within the County	-
14-17	XXXX	Numerical Code	City Coding Number	-
18-19	XX	Numerical Code	UTM Zone Number	-
20-21	XX	Numerical Code	Year of Record	-
22-61	A-A	Alphabetical and Numerical	Name and Address of Establishment	-
62-73	A-A	Alphabetical	Person to Contact about Pollution Control	-
74	A	Alphabetical	Ownership of Facility	-

1. State Coding Number: Identification coding lists are tabulated in the Geographical Identification Code, Appendix A, Section 1. These codings are compatible with the SAROAD air quality numbering system.
2. County codes to be used are listed in the SAROAD Station Coding Manual for Aerometric Sampling Networks, Publication No. APTD-0907 of the Environmental Protection Agency.[1]
3. AQCR Number: Numbers for the Air Quality Control Regions are specified in the Geographical Identification Code, Appendix A, Section 1.

4. Source Number: This column identifies each point source in a county. The numbering system is sequential, starting with the number one and continuing until all facilities containing point sources that are located in a given county are assigned a number. It should be noted that each plant, facility, or establishment containing one or more emission points (e.g., stacks) will be assigned a unique identification number within the county.

5. City Coding Number: It is advantageous to identify those point sources that are within cities, towns, or urban areas. If the source is within the geographical boundaries of any of the cities listed in the SAROAD Station Coding Manual for Aerometric Sampling Networks,[1] enter the four-digit code number corresponding to that city. There are a few cities in the United States that are not considered to be inside any county but, rather, are considered independent entities. In such cases, enter the city code in both "city" and "county" coding columns.

6. UTM Zone Number: The zone number must be known in order to locate the point source via the UTM coordinate system; this number is found on all USGS maps showing UTM coordinates. Although most states are within a single UTM zone, a few states and counties are in two UTM zones. For this reason a UTM zone number is required for each coding form.

7. Year of Record: The last two digits of the calendar year that the data on card 1 represent are recorded here.

8. Establishment Name and Address: This column will, in most cases, provide a descriptive name for the facility and a usable mailing address. It is important to leave blank spaces between words to ensure readable entries. Common abbreviations, such as AM for American, CO for company, BROS for brothers, and INC for incorporated, should be used as much as possible. The address should include a street number, city, and, preferably, a zip code. The state name is unnecessary. Again, abbreviate when possible to conserve space and to allow room for an intelligible and usable address; abbreviate the city's name if necessary. Record the physical location of the source if possible, rather than the name and address of a distant headquarters. If there is no official proper name for the source, then record a descriptive name and usable address, such as CITY DUMP NR 3, ENGR DEPT, CITY HALL.

9. Person to Contact about Pollution Control: The last name of the person responsible for pollution control activity at the source should be recorded in this column. If the responsible individual is not identifiable, then record a descriptive and appropriate title such as PLANT MGR. Leave blank spaces between names and initials.

10. Ownership of Facility: The following code list should be used to complete this column:

Symbol	Ownership
P	Private
L	Local government
S	State government
F	Federal Government
U	Utility (electric power plants, etc.)

4.4 STACK PARAMETERS

Cards 2 through 6 on the coding form relate to separate emission points that are located within the facility (identified on card 1). For example, a facility or plant as previously defined could have more than one point within its boundaries where pollutants are discharged to the atmosphere. One coding form must be completed for each of these locations within the facility. For example, if there are two separate smokestacks within a power-plant complex, then complete two coding forms and include: (1) the same facility identification number and data on card 1, and (2) different emission point identification numbers (referring to the individual smokestacks) on cards 2 through 6 of each form.

Occasionally, a qualitative judgment must be made when the distinction between emitting point sources within the facility is vague. Common sense should then dictate whether the sources should be reported separately on the coding form or combined into a single, apparent point source. For example, if a single drying kiln has a multitude of vents to the atmosphere from the same process, then combining these vents into a single one for reporting purposes would be acceptable. If the same stack or control equipment is used for two different processes that operate seasonally or consecutively during the year, then consider this particular facility to have two separate emission points and complete two coding forms.

Card 2 - Stack Parameters

Spaces	Format	Symbol	Description	Unit
14-15	XX	Numerical	Emission Point Identification Number	-
16-17	XX	Numerical	Year of Record	-
18-21	XXXX	Numerical Code	SIC Code	-
22-23	XX	Numerical Code	Process Code	-
24-27	XXX.X	Numerical	UTM Horizontal Coordinates	km

Card 2 (continued) - Stack Parameters

Spaces	Format	Symbol	Description	Unit
28-32	XXX.X	Numerical	UTM Vertical Coordinates	km
33-36	XXXX	Numerical	Stack Height	ft
37-39	XX.X	Numerical	Stack Equivalent Diameter	ft
40-43	XXXX	Numerical	Stack Temperature	°F
44-50	XXXXXXX	Numerical	Stack Exhaust Flow Rate	ft^3/min
51-54	XXXX	Numerical	Plume Height	ft

1. Emission Point Identification Number: This is a sequential number designated for each pollutant discharge point within the facility. One coding form will be completed for every point source within the facility.

2. Year of Record: The last two digits of the year that the data on card 2 represent should be entered here. This column will be automatically updated whenever information on the card is added, changed, or deleted.

3. SIC Code: This information is necessary to use the source data for modeling air quality. Enter the appropriate Standard Industrial Classification code (SIC code).[2]

4. Process Code: This column should be completed only when a process code for the activity has been listed in Appendix A, Section 4.

5. UTM Horizontal and Vertical Coordinates: The UTM coordinate system is another means of identifying the location of the point source. Coordinates are obtained from USGS maps or their equivalent with scales less than 1:62,500. All spaces in these columns must be filled in with numbers and zeros if coordinates are available to an accuracy of 1 kilometer (0.1-kilometer accuracy is desired); otherwise, leave the columns blank.

6. Stack Height: In the majority of cases, the exact location of the discharge of pollutants will be well defined; there will be a stack or some other enclosed, constrained, or physically-bounded area where pollutants are emitted. In such instances, the stack height is the vertical distance between the point of emission and ground level. If an estimate of stack height must be made, that value will be rounded to the nearest 10 feet and entered on the form. There are, however, point sources that have one or more of the following characteristics:

   a. No clear-cut or enclosed point of emission.

   b. No stack height (e.g., burning dumps).

   c. A changing locus of emissions within the facility (i.e., leaking valves at an oil refinery, dust from moving equipment in a quarry).

In such cases, the stack height, temperature, and flow rate columns on the coding form will be marked with zeros, and columns 51 through 54 on card 2 will be completed.

7. Stack Diameter: The stack diameter is the inside diameter of a round gas exit at the point of emission; for non-round exits, it is an equivalent diameter calculated from the cross-sectional area at point of discharge. Using a measured or estimated cross-sectional area, the equivalent diameter (De) is calculated as follows:

$$De = 1.128 \sqrt{A}$$

where A is in square feet. Stack diameters up to 99.9 feet can be entered in this column; these values may be needed to calculate a single equivalent diameter for a number of small, combined emission points. For example, if it has been decided to report four vents as a single emission point, then the equivalent diameter would be obtained by summing up the cross-sectional areas of the four vents before calculating De. For another common occurrence--the rectangular stack exit--the stack diameter must be calculated from the total cross-sectional area; it cannot be assumed to be one of the linear dimensions.

8. Stack Temperature: The temperature of the exhaust stream at the stack exit should be reported in degrees Fahrenheit under normal operating conditions. If measured temperatures are not available, an estimate to the nearest 50° F should be made. If no fuel combustion is involved in the process, and if the exhaust gas appears to be discharged at ambient air temperatures, then record the stack gas temperature as 50° F unless a more valid assumption is apparent.

9. Stack Exhaust Flow Rate: This number should be specified by recording the design or maximum exhaust-gas volume unless actual measurements are available. Units are actual cubic feet per minute and represent the total volume of exhaust gas released at the operating temperature of the stack (assume gas pressure is the same as normal atmospheric pressure).

10. Plume Height: This column is to be filled in if the previous spaces on stack data (except temperature) all contain zeros. Conversely, if stack height, diameter, temperature, and flow rate were reported, then this column should contain a zero. The plume height is a gross estimate and is used only when the source has one of the following characteristics:

    a. No clear-cut enclosed point of emission (e.g., gas leaks at an oil refinery).

b. No stack height (e.g., burning dumps).

c. A mobile emission point within the facility (e.g., quarry).

d. Pollutants released into the atmosphere at ambient temperatures through diffusion (e.g., gasoline storage tanks).

Many point sources have no true stack release points (whereby the gases are forcibly exhausted to the atmosphere from an enclosed area). In such cases columns 51 through 54 must be completed. If there is a physically definable height above ground level where the pollutants are discharged, then enter this value (in feet) in the spaces. Examples of this class are gasoline storage tanks and uncontrolled grain-drying operations where the height of the tank or dryer would be considered the plume height. On the other hand, some sources, such as some quarries, burning dumps, and gas leaks at ground level at an oil refinery, have no discernible emission height. In such cases enter a zero in column 54. Processes that discharge emissions at ambient temperatures mainly through ground-level leakage or diffusion should also be considered to have a zero plume height. In such cases the exhaust flow rate entered in columns 44 through 50 will also be zero.

4.5 CONTROL EQUIPMENT IDENTIFICATION CODE

Card 3 contains data on the installed air pollution control equipment at the point source and on the corresponding pollutant removal efficiency of that equipment. Data correspond to the point source identified on card 2 of the coding form.

1. Year of Record: The last two digits of the calendar year that the data on card 3 represent should be entered here.
2. Boiler Design Capacity: Numerical values in this column should be entered if the boiler burns fuel to heat water or steam, or if it is normally sold according to the heating capacity (Btu per hour). Otherwise, enter a zero in the column to depict nonapplicability. Units are in millions of Btu per hour based on the maximum capacity or design of the boiler.
3. Pollutant Control Equipment: Any installed equipment or device that is located at the point source and whose primary purpose is reducing emissions of pollutants must be reported in these columns using only those coding values tabulated in the Control Equipment Identification Code, Appendix A, Section 3. In cases where the efficiency range of the device is unknown, or where none of the equipment codes appear to be applicable, choose the device listed in the Control Equipment Identification Code that most nearly resembles the actual equipment, and include a brief comment on card 6 of the coding form. Only control devices that reduce the uncontrolled emissions normally associated with the specific source process should be

Card 3 - Control Equipment

Spaces	Format	Symbol	Description	Units
16-17	XX	Numerical	Year of Record	-
18-22	XXXXX	Numerical	Boiler Design Capacity	10^6 Btu/hr
23-25	XXX	Numerical Code	Primary Particulate Control Equipment Code	-
26-28	XXX	Numerical Code	Secondary Particulate Control Equipment Code	-
29-31	XXX	Numerical Code	Primary SO_x Control Equipment Code	-
32-34	XXX	Numerical Code	Secondary SO_x Control Equipment Code	-
35-37	XXX	Numerical Code	Primary NO_x Control Equipment Code	-
38-40	XXX	Numerical Code	Secondary NO_x Control Equipment Code	-
41-43	XXX	Numerical Code	Primary Hydrocarbon Control Equipment Code	-
44-46	XXX	Numerical Code	Secondary Hydrocarbon Control Equipment Code	-
47-49	XXX	Numerical Code	Primary CO Control Equipment Code	-
50-52	XXX	Numercial Code	Secondary CO Control Equipment Code	-
53-55	XX.X	Numerical	Estimated Control Efficiency, Particulates	%
56-58	XX.X	Numerical	Estimated Control Efficiency, SO_x	%
59-61	XX.X	Numerical	Estimated Control Efficiency, NO_x	%
62-64	XX.X	Numerical	Estimated Control Efficiency, Hydrocarbon	%
65-67	XX.X	Numerical	Estimated Control Efficiency, CO	%

reported. Do not report equipment that is a normal part of the source activity even though the quantity of pollutants emitted may be reduced. For example, a recovery furnace is a normal part of a kraft pulp mill and should not be reported as pollution control equipment. If there are no control devices actually installed at the source, enter a zero in each column; if the status of the source is unknown, leave the columns blank. Primary and secondary control equipment for each of the five common pollutants can be reported in these columns. Enter a zero in the spaces for secondary control equipment if no secondary devices are presently installed. Engineering judgment must be used to ascertain whether a given control device significantly reduces emissions of more than one pollutant; if it does, the coding representing the same physical device may be entered in more than one of the columns.

4. Estimated Control Efficiency: The overall collection efficiencies in weight percent of all control equipment at the point source should be entered for each of the five pollutants. Assume that the pollutant load entering the control equipment is the normal, uncontrolled quantity for that specific process. If removal efficiency for a particular pollutant is unknown, leave that space blank; if there is no effective removal, then enter a zero in the column.

4.6 OPERATING INFORMATION AND EMISSION ESTIMATES

Card 4 contains data on the operating schedule of the source as well as the estimated annual emissions from that source. This information is required to determine the release of pollutants on a seasonal, monthly, or time-of-week basis. Such data are valuable to an enforcement agency in properly selecting an effective air pollution control strategy.

1. Year of Record: The last two digits of the calendar year that the data on card 4 represent should be entered here.
2. Percent of Annual Throughput: The annual production, consumption, throughput, or other valid number representing the operating of the source should be proportionally divided into the four 3-month categories shown on the coding form. The weighted portion of production occurring in each category is reported as a percentage of the total annual throughput. For example, if a boiler operates only during the months of December, January, and February, then 99 percent would be entered in the appropriate column.
3. Normal Operating Time: The hours per day, days per week, and weeks per year that the source operates under normal and usual conditions should be entered here. It should be emphasized that this column refers to activity

Card 4 - Emission Estimates

Spaces	Format	Symbol	Description	Units
16-17	XX	Numerical	Year of Record	-
18-19	XX	Numerical	Percent of Annual Throughput (Dec., Jan., Feb.)	%
20-21	XX	Numerical	Percent of Annual Throughput (Mar., Apr., May)	%
22-23	XX	Numerical	Percent of Annual Throughput (June, July, Aug.)	%
24-25	XX	Numerical	Percent of Annual Throughput (Sept., Oct., Nov.)	%
26-27	XX	Numerical	Normal Operating Hours per Day	hr
28	X	Numerical	Normal Operating Days per Week	da
29-30	XX	Numerical	Normal Operating Weeks per Year	wk
31-37	XXXXXXX	Numerical	Emissions Estimate - Particulate	T/yr
38-44	XXXXXXX	Numerical	Emissions Estimate - SO_x	T/yr
45-51	XXXXXXX	Numerical	Emissions Estimate - NO_x	T/yr
52-58	XXXXXXX	Numerical	Emissions Estimate - Hydrocarbons	T/yr
59-65	XXXXXXX	Numerical	Emissions Estimate - CO	T/yr
66	X	Numerical Coding	Method of Estimating Particulate Emissions	-
67	X	Numerical Coding	Method of Estimating SO_x Emissions	-
68	X	Numerical Coding	Method of Estimating NO_x Emissions	-
69	X	Numerical Coding	Method of Estimating Hydrocarbon Emissions	-
70	X	Numerical Coding	Method of Estimating CO Emissions	-
71-73	XX.X	Numerical	Portion of Fuel Used for Space Heat	%

of the point source, not of the entire facility. For example, an industrial boiler in a plant may be operating 7 days a week even though the plant may be shut down on Saturdays and Sundays. In this case, the number 7 should be entered in the appropriate space for days per week. If the source is operating at more than 25 percent of its normal rate, consider the source to be fully operating during that time period. If production is less than 25 percent of the normal rate, consider the source as not operating during that time period.

4. Emission Estimates: The annual, controlled emissions from the point source, in tons per year, should be entered here. These calculations should include the effect of pollutant removal by installed control equipment.

5. Method of Estimating Emissions: The following code list must be used to specify the method used to ascertain the emissions reported in columns 66 through 70:

Code	Description of Method
0	Not applicable (if emissions are negligible)
1	Stack-test results or other emission measurements
2	Material balance using engineering knowledge and expertise of process
3	Emissions calculated using emission factors
4	Guess

6. Portion of Fuel Used for Space Heating: An estimate of the percent of total fuel used for space heating at the plant should be entered here. If no fuel is used for space heating, enter zero in this column.

4.7 COMPLIANCE ANALYSIS

Allowable emissions and compliance schedules for the source are recorded on card 5. All entries are to reflect the current legal requirements of the source to comply with the most stringent air pollution control regulations in effect.

1. Year of Record: The last two digits of the calendar year that the data on card 5 represent should be entered here.

2. Allowable Emissions: Entered here should be the maximum emissions of each pollutant, in tons per year, that the source is legally allowed to discharge into the atmosphere under the most stringent of the following conditions:

   a. Existing local, state, or Federal legislation.

b. Imminent legislation that will legally require the source to comply to a certain discharge limitation within the year of record specified in columns 16 and 17.

c. Official agreements with air pollution control regulatory agencies whereby the source must reduce emissions to a given quantity per year within the year of record specified in columns 16 and 17.

Card 5 - Compliance Analysis

Spaces	Format	Symbol	Description	Units
16-17	XX	Numerical	Year of Record	-
18-24	XXXXXXX	Numerical	Allowable Emissions - Particulate	T/yr
25-31	XXXXXXX	Numerical	Allowable Emissions - SO_x	T/yr
32-38	XXXXXXX	Numerical	Allowable Emissions - NO_x	T/yr
39-45	XXXXXXX	Numerical	Allowable Emissions - Hydrocarbons	T/yr
46-52	XXXXXXX	Numerical	Allowable Emissions - CO	T/yr
53	X	Numerical Coding	Source Compliance Status	-
54-55	XX	Numerical	Year Source Must Be in Compliance (complete only if compliance status = 2,3)	-
56-57	XX	Numerical	Month Source Must Be in Compliance (complete only if compliance status = 2,3)	-
58-59	XX	Numerical	Year of Compliance Status Update	-
60-61	XX	Numerical	Month of Compliance Status Update	-
62-63	XX	Numerical	Day of Compliance Status Update	-
64	X	Numerical Code	Emergency Control Action Program (ECAP) Status	-
65-68	XXXX	Numerical Code	Control Regulation No. 1	-
69-72	XXXX	Numerical Code	Control Regulation No. 2	-
73-76	XXXX	Numerical Code	Control Regulation No. 3	-

Allowable emissions should be calculated in the same manner as intended by the most stringent laws affecting the source. For example, if allowable emissions are 5 pounds SO_2 per ton of daily production, then an average annual production should be estimated and multiplied by the 5 pounds SO_2 factor to calculate the annual quantity of SO_2 allowed to be emitted to the atmosphere. If allowable emissions are unknown, leave the spaces blank.

3. Source-Compliance Status: Air pollution control enforcement agencies often allow sources of air pollution an extended, but definite, period of time to design and install air pollution control equipment. This act of leniency is referred to as a "variance;" if the source succeeds in reducing its emissions by the required date, then the law has been satisfied and the source has met its pollution control obligation. One of the following codes must be selected to record the present status of the source under existing legal requirements.

Code	Description
1	Source is in compliance with the most stringent air pollution control requirements.
2	Source is not in compliance with existing legislation and no variance has been given. (Complete columns 54 through 57 on card 5.)
3	Source is not in compliance with existing legislation but a variance has been given. (Complete columns 54 through 57 on card 5.)
4	Compliance status is unknown.

4. Year and Month Source Must be in Compliance: These columns should be completed only when code 2 or code 3 is entered in column 53. If codes 1 or 4 are entered in column 53, then these spaces should be left blank.

5. Time of Compliance Update: The day, month, and year of the most recent change in compliance status for the source should be entered in these columns. Leave spaces blank if compliance status has been reported as unknown. If the source is in compliance with existing air pollution control legislation, then record the time that such legislation was enacted.

6. Emergency Control Action Program (ECAP): Certain point sources are required to submit to government agencies an ECAP that specifies a detailed plan for immediately reducing emissions whenever air pollution in an area is considered an emergency condition. The following list shall be used to denote whether or not an ECAP has been submitted to an appropriate govern-

ment agency. Leave blank if status is unknown.

Code	Description
0	ECAP is not required.
1	ECAP is required but has not been submitted.
2	ECAP has been submitted.

7. Control Regulations: Spaces 65 through 76 are used to identify air pollution control regulations that are in effect and apply to the source. Instructions and coding lists for completing these entries are detailed in the Compliance Regulation Identification Code, Appendix A, Section 5.

4.8 FUEL, PROCESS, OR SOLID-WASTE INFORMATION

The operating characteristics of the source are defined on card 6. Because there may be many functionally separate processes that discharge exhaust gases into the same stack, a standard procedure was developed to report and retain such data. The instructions that apply to this procedure are as follows: (1) Cards 2 through 5 on the coding form contain data pertinent to an individual point of emission within the facility that can be geographically separated from other emission points; and (2) There are five cards 6 on each coding form to record up to five separate processes that may be contributing to the exhaust gases discharged from a particular emission source. Thus if exhaust gases from two dryers are discharged into a single smokestack, then two of the five cards 6 on the coding form should be completed. Similarly, if one boiler simultaneously uses coal and two grades of oil as fuel, then three of the five cards 6 should be completed.

1. Year of Record: The last two digits of the calendar year that the data on card 6 represent should be entered here.
2. Source Classification Code (SCC): The SCC process description in the Source Classification Code, Appendix A, Section 2, that most nearly describes the process should be entered by its eight-digit numerical code. If the most appropriate SCC description appears to be significantly different from the actual process, enter nothing in this field, but enter NEW SCC NEEDED in the comment section, columns 51 through 70.
3. Annual Charging Rate of Fuel, Process, or Solid Waste: The units in which the charging rates must be expressed are listed for each SCC in Appendix A, Section 2. The average annual operating rates will be reported and entered in the columns in those units given in Appendix A that correspond to the appropriate SCC of the process. Thus, for coal combustion, the process rate is expressed in tons of coal burned per year, whereas, when oil is burned, the units are thousands of gallons burned per year.

Card 6 - Fuel, Process, and Solid-Waste Data

Spaces	Format	Symbol	Description	Units
16-17	XX	Numerical	Year of Record	-
18-25	XXXXXXXX	Numerical Code	Source Classification Code (SCC)	-
26-32	XXXXXXX	Numerical Code	Annual Charging Rate of Fuel Process or Solid Waste	(SCC)*/yr
33-39	XXXX.XXX	Numerical Code	Maximum Hourly Design Rate	(SCC)*/yr
40-42	X.XX	Numerical	Sulfur Content	%
43-45	XX.X	Numerical Code	Ash Content	%
46-50	XXXXX	Numerical Code	Heat Content, Millions of Btu	(SCC)*
51-70	A-A	Alphabetical	Comments	-
71	A	Alphabetical	Source Code	-
72	X	Numerical	Confidentiality of Data	-

* Note: Each of the code columns above that specify a numerical code symbol requires reference to and use of the Source Classification Code (SCC), Appendix A, Section 2.

4. Maximum Hourly Design Rate: The maximum hourly design rate of the most important process equipment, or the upper operating limit that generally would not be exceeded in normal practice, should be entered here. Units are expressed in those corresponding to the SCC for the process. (Note that design quantities are expressed in hourly operating rates, and that a decimal point is positioned in this column. Location of the decimal point is based on the relationship of hourly capacity to annual process rate contained in the previous field.)
5. Sulfur and Ash Contents: Entries are to be made in these columns for all combustion processes. If the process does not burn fuel, then enter a zero in this column. Leave spaces blank if the process uses combustion but the sulfur or ash contents of the fuel are unknown.
6. Heat Content: This column is to be completed only when the process involves combustion. If the process does not involve combustion, enter a zero in

this column to denote nonapplicability. Units are millions of Btu per SCC. Thus, for natural gas combustion the number entered would be as follows: (10^3 Btu/cubic foot) (10^6 cubic feet/SCC)/10^6 = 1000.

7. Source Code: A quick visual check of the process category reported on card 6 is useful. Use the following list and enter the appropriate code in this column:

Code	Description of Source
B	Boiler
P	Process
C	Other combustion unit

8. Confidentiality of Data: Process information occasionally is collected by a government agency under a guarantee that the data will be treated in a confidential manner and will not be released to the public. This column specifies whether or not any data on cards 2 through 6 are officially considered confidential. Use the following list to select the appropriate code number. Leave the space blank if confidentiality status is unknown.

Code	Description
1	Some data on cards 2 through 6 are confidential.
2	No information on the coding form is confidential.

4.9 REFERENCES

1. SAROAD Station Coding Manual for Aerometric Sampling Networks. U.S. Environmental Protection Agency, Office of Air Programs. OAP Publication No. APTD-0907. Research Triangle Park, North Carolina. February 1972.
2. Standard Industrial Classification Manual. U.S. Bureau of the Budget, Office of Statistical Standards. Washington, D.C. 1967.

5. AREA SOURCE CODING

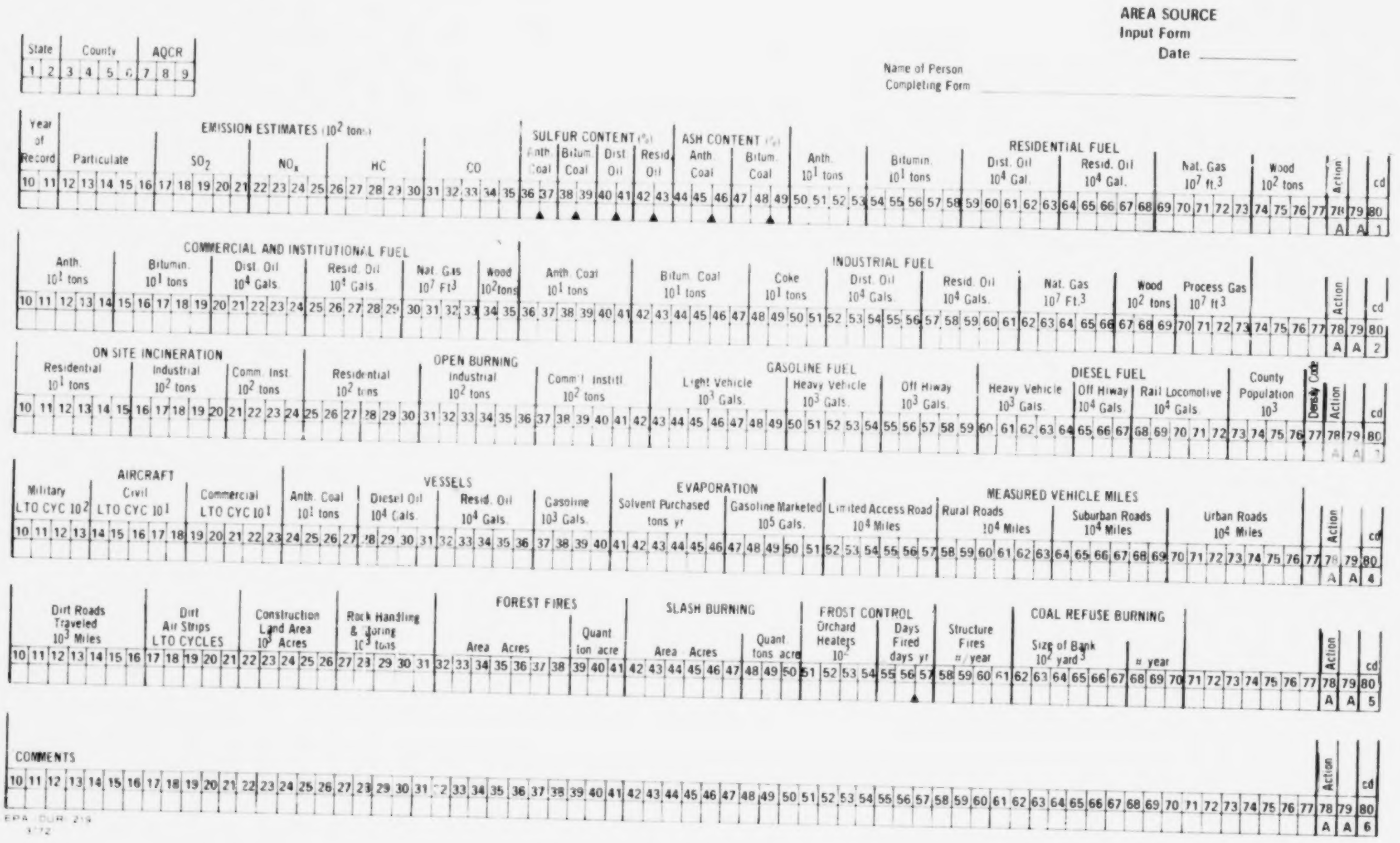
5.1 IDENTIFICATION OF AREA SOURCE

This chapter presents techniques to be used both for estimating area source quantities and for completing the area source coding form shown in Figure 5-1. The chapter subsections devoted to each area source category include a brief description of the source category, discuss the data collection methods that are to be used to obtain area source totals, and state how to fill out the area source coding form and how to apportion the county totals to the proper source categories. Also, general guidelines concerning the proper application of the methods are given.

An important point to remember is that an area source actually represents a collection of many small sources. Each small source may emit only very small quantities of air pollutants, but, because of the great number of small sources, their collective impact may be very significant. The object of area source calculations is to obtain an accurate estimate of this collective contribution to total emissions. Such an estimate can never be exact, however, because it would be impossible to determine the emissions from every small source individually. For instance, it would be impossible to monitor continuously every automobile in the study area and determine the total emissions from automobile operation by adding up the individual totals. Hence, the emissions from sources too small or too difficult to be surveyed individually have to be reported collectively as "area sources." In the area source format, each county or county equivalent (parish, census division, independent city, etc. for states where counties are not used) is defined as the smallest region for which area sources are calculated. In areas where detailed modeling of air quality data is desirable, the format will accommodate subdivision of counties into UTM-based grid zones for processing. (County area source totals can be apportioned to grid zones according to the procedures discussed in this chapter.)

5.2 COUNTY INFORMATION (COLUMNS 1 THROUGH 9 OF ALL CARDS; COLUMNS 10 AND 11 OF CARD 1; AND COLUMNS 73 THROUGH 77 OF CARD 3)

Each area source is uniquely identified by a two-digit code identifying the state, a four-digit code identifying the county, and a three-digit code identifying the AOCR. The proper codes defined by the SAROAD system[1] can be found from the Geographical Identification Code in Appendix A, Section 1. The year the data represent should be entered in spaces 10 and 11 of card 1. The county population and the population distribution code should be entered in spaces 73 through 77 of



AREA SOURCE
Input Form
Date ____________

Name of Person
Completing Form ______________________________

State	County	AQCR
1 2	3 4 5 6	7 8 9

	EMISSION ESTIMATES (10^2 tons)					SULFUR CONTENT (%)				ASH CONTENT (%)		RESIDENTIAL FUEL								
Year of Record	Particulate	SO_2	NO_x	HC	CO	Anth. Coal	Bitum. Coal	Dist Oil	Resid. Oil	Anth. Coal	Bitum. Coal	Anth. 10^1 tons	Bitumin. 10^1 tons	Dist. Oil 10^4 Gal.	Resid. Oil 10^4 Gal.	Nat. Gas 10^7 ft.3	Wood 10^2 tons	Action		cd
10 11	12 13 14 15 16	17 18 19 20 21	22 23 24 25	26 27 28 29 30	31 32 33 34 35	36 37	38 39	40 41	42 43	44 45 46	47 48 49	50 51 52 53	54 55 56 57 58	59 60 61 62 63	64 65 66 67 68	69 70 71 72 73	74 75 76 77	78	79	80
						▲	▲	▲	▲	▲	▲							A	A	1

COMMERCIAL AND INSTITUTIONAL FUEL						INDUSTRIAL FUEL											
Anth. 10^1 tons	Bitumin. 10^1 tons	Dist. Oil 10^4 Gals.	Resid. Oil 10^4 Gals.	Nat. Gas 10^7 Ft3	Wood 10^2tons	Anth. Coal 10^1 tons	Bitum. Coal 10^1 tons	Coke 10^1 tons	Dist. Oil 10^4 Gals.	Resid. Oil 10^4 Gals.	Nat. Gas 10^7 Ft.3	Wood 10^2 tons	Process Gas 10^7 ft 3		Action		cd
10 11 12 13 14	15 16 17 18 19	20 21 22 23 24	25 26 27 28 29	30 31 32 33	34 35	36 37 38 39 40 41	42 43 44 45 46 47	48 49 50 51	52 53 54 55 56	57 58 59 60 61	62 63 64 65 66	67 68 69	70 71 72 73	74 75 76 77	78	79	80
															A	A	2

ON SITE INCINERATION			OPEN BURNING			GASOLINE FUEL			DIESEL FUEL							
Residential 10^1 tons	Industrial 10^2 tons	Comm. Inst. 10^2 tons	Residential 10^2 tons	Industrial 10^2 tons	Comm'l Institl 10^2 tons	Light Vehicle 10^3 Gals.	Heavy Vehicle 10^3 Gals.	Off Hiway 10^3 Gals.	Heavy Vehicle 10^3 Gals.	Off Hiway 10^4 Gals	Rail Locomotive 10^4 Gals	County Population 10^3	Density Code	Action		cd
10 11 12 13 14 15	16 17 18 19 20	21 22 23 24	25 26 27 28 29 30	31 32 33 34 35 36	37 38 39 40 41 42	43 44 45 46 47 48 49	50 51 52 53 54	55 56 57 58 59	60 61 62 63 64	65 66 67	68 69 70 71 72	73 74 75 76	77	78	79	80
														A	A	3

AIRCRAFT			VESSELS				EVAPORATION		MEASURED VEHICLE MILES							
Military LTO CYC 10^2	Civil LTO CYC 10^1	Commercial LTO CYC 10^1	Anth. Coal 10^1 tons	Diesel Oil 10^4 Gals.	Resid. Oil 10^4 Gals.	Gasoline 10^3 Gals.	Solvent Purchased tons yr	Gasoline Marketed 10^5 Gals.	Limited Access Road 10^4 Miles	Rural Roads 10^4 Miles	Suburban Roads 10^4 Miles	Urban Roads 10^4 Miles		Action		cd
10 11 12 13	14 15 16 17 18	19 20 21 22 23	24 25 26 27	28 29 30 31	32 33 34 35 36	37 38 39 40	41 42 43 44 45 46	47 48 49 50 51	52 53 54 55 56 57	58 59 60 61 62 63	64 65 66 67 68 69	70 71 72 73 74 75 76	77	78	79	80
														A	A	4

				FOREST FIRES		SLASH BURNING		FROST CONTROL			COAL REFUSE BURNING					
Dirt Roads Traveled 10^3 Miles	Dirt Air Strips LTO CYCLES	Construction Land Area 10^3 Acres	Rock Handling & Storing 10^3 tons	Area Acres	Quant ton acre	Area Acres	Quant. tons acre	Orchard Heaters 10^{-}	Days Fired days yr	Structure Fires #/year	Size of Bank 10^2 yard^3	# year		Action		cd
10 11 12 13 14 15 16	17 18 19 20 21	22 23 24 25 26	27 28 29 30 31	32 33 34 35 36 37 38	39 40 41	42 43 44 45 46 47	48 49 50	51 52 53 54	55 56 57	58 59 60 61	62 63 64 65 66 67	68 69 70	71 72 73 74 75 76 77	78	79	80
									▲					A	A	5

COMMENTS	Action		cd
10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77	78	79	80
	A	A	6

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Figure 5-1. Area source coding form.

card 3. The county population, to the nearest thousand, must be determined from the 1970 Census of Population.[2] This publication also gives the urban-rural population breakdown. Using this information, the correct population distribution code should be entered according to the designations below.

Population Distribution Code	Population Breakdown
0	<10% urban
1	10 - 20% urban
2	20 - 30% urban
3	30 - 40% urban
4	40 - 50% urban
5	50 - 60% urban
6	60 - 70% urban
7	70 - 80% urban
8	80 - 90% urban
9	>90% urban

5.3 EMISSION ESTIMATES (COLUMNS 12 THROUGH 35, CARD 1)

The most recent emission estimates, in hundreds of tons per year, should be entered. Such estimates should be obtained either from the state's implementation plan emission inventory or from a more recent inventory, if available. Rounding off emission totals to hundreds of tons does not sacrifice accuracy. Nearly every county will have emissions of at least 100 tons of each of the five major pollutants. A figure of 100 tons is also the smallest significant figure that can be reported for emission totals. The units shown for each of the area source quantities on the coding form are such that emissions can be reported down to the order of magnitude of 1 ton. The precision of emission factors and the data to which these factors are applied does not justify reporting countywide emissions of less than 100 tons.

5.4 FUEL DATA (COLUMNS 46 THROUGH 49, CARD 1)

The percent sulfur and ash contents entered here are necessary for calculation of sulfur oxide and particulate emissions from fuel combustion. The figures entered should be weighted averages for the fuels consumed by area sources. For instance, if the bituminous coal sulfur contents and fuel consumption totals are as follows:

Residential: 1000 tons, 1.4 percent sulfur
Commercial-institutional: 500 tons, 1.6 percent sulfur
Industrial: 1500 tons, 2.0 percent sulfur

Then the weighted average sulfur content is calculated as follows:

$$\begin{array}{rcl} 1000 \times 1.4 & = & 1400 \\ 500 \times 1.6 & = & 800 \\ \underline{1500} \times 2.0 & = & \underline{3000} \\ 3000 & & 5200 \end{array}$$

The average sulfur content = $\frac{5200}{3000}$ = 1.73 percent.

Some areas have regulations limiting the sulfur content of fuels. If, for instance, no bituminous coal with a sulfur content of more than 1.5 percent can be burned, and if it is known that no significant amount of coal with a sulfur content of less than 1.5 percent is burned, then the weighted average sulfur content for bituminous coal can be assumed to be 1.5 percent. The figures entered on the form must represent the fuel that is actually being used, however, and not the fuel that is supposed to be used or that will be used at some time in the future. Experience has shown that one set of weighted average fuel factors is adequate for each fuel being used in the county. The figures for each source category that may be found are also averaged numbers. The main concern is to obtain one set of fuel factors that will permit accurate countywide emission estimates to be calculated.

5.5 STATIONARY SOURCE FUEL CONSUMPTION (COLUMNS 50 THROUGH 77, CARD 1; AND COLUMNS 10 THROUGH 77, CARD 2)

The quantity of fuel consumed by each source category must be ascertained. The source categories are as follows:

1. Residential: This category includes all residential dwellings, from single-family residences to multi-story apartment complexes.
2. Commercial-institutional: This category includes retail and wholesale stores, schools, hospitals, government buildings, and other public buildings.
3. Industrial: This category includes all manufacturing industries with emissions too small to qualify as point sources.

Collectively, the three categories above account for all the stationary fuel combustion activities that are not usually reported as point sources. The breakdown into source categories is necessary to show how each type of fuel combustion activity contributes to the total air pollutant emissions. Such information is very useful and often essential for the formulation of control strategies to achieve air quality goals.

The six major fuels and three generally less important fuels that may be consumed by area sources are listed below.

5.5.1 Major Fuels

5.5.1.1 Anthracite Coal[3] - Anthracite, or hard coal, is produced almost exclusively in Pennsylvania and is available in significant quantities only in states that are within easy shipping distance from Pennsylvania. Anthracite may be consumed by all source categories, although most is used by residential sources.

5.5.1.2 Bituminous Coal[3] - Because production of bituminous coal is more widespread than production of anthracite, the former is available in most areas of the country. Also included as bituminous coal are the lower grades of sub-bituminous coal and lignite. Because bituminous coal does not burn as cleanly as anthracite, a smaller proportion is used residentially. Bituminous coal is often favored for use by electric utilities, manufacturing industries, and coke producers.

5.5.1.3 Distillate Oil[4] - Distillate oil includes fuel oil grades 1, 2, and 4. In addition, diesel fuel and kerosene can be considered distillate-type oils. Nationwide, residential and commercial-institutional sources are the largest consumers of distillate oil.

5.5.1.4 Residual Oil[4] - Residual oil includes fuel oil grades 5 and 6. In most areas residual oil is not used by residential sources, but significant amounts may be consumed by industrial and commercial-institutional users.

5.5.1.5 Natural Gas[5] - Natural gas, consisting principally of methane but containing other hydrocarbon gases as well, is used in significant amounts by all source categories.

5.5.1.6 Wood - Wood may be used as heating fuel by residential sources (primarily in rural areas where wood is readily available), by industrial sources, and by commercial-institutional sources (usually in very small amounts). The chief industrial users of wood as heating fuel are those wood-processing industries such as sawmills, plywood mills, and furniture manufacturers that generate large amounts of wood waste that can be consumed in boilers.

5.5.2 Minor Fuels

5.5.2.1 Liquefied Petroleum Gas - Liquefied petroleum gas (LPG) consists of higher-carbon-number hydrocarbons such as propane and butane.[6] The contribution from LPG combustion to total emissions is not significant in most areas. Where LPG use is considerable, however, it should be recorded as "equivalent natural gas" according to the procedure described later in this chapter. Should LPG use become more widespread in the future, the format will be expanded by designating separate spaces or adding new cards to accommodate LPG consumption. At present, it is not necessary to report LPG use in many areas, however.

5.5.2.2 Coke - Coke is made by destructive distillation of coal to remove the volatile components.[3] Although primarily used by the iron and steel industry, some coke may appear as an industrial area source fuel.

5.5.2.3 Process Gas - Process gas, or "sour gas" as it is sometimes termed, is often used at petroleum and petro-chemical refining operations as well as at natural gas production plants. Process gas, which is usually characterized by a high sulfur content and relatively low heat content, cannot be marketed commercially. In addition, "coke gas," the gaseous product of destructive distillation of coal, has some heating value and may be used industrially.

5.5.3 Estimating Area Source Fuel Consumption

Either of two methods can be used for estimating the quantity of fuel consumed in an area.

5.5.3.1 Local Fuel Dealers Method - Most fuel retailers maintain sales records that can be a valuable source of information for the determination of area source fuel consumption. The information needed from fuel dealers concerns their annual sales by county to each source category. The area source totals of residential and commercial-institutional fuel consumption are then simply the fuel dealers' figures minus any fuel consumed by point sources included in these source categories. Because dealer sales to industrial users may not adequately represent the amount of fuel consumed by industrial sources, the second method is primarily used for industrial fuel determination. Any information gained from fuel dealers would be useful, however.

It is important that all fuel dealers be contacted. The accuracy of the survey results will be significantly reduced if some fuel dealers are overlooked. It may be that not all fuel dealers will be able to furnish adequate information. In the past, natural gas dealers have been best able to furnish the required data. Other dealers either have been reluctant to release information, or simply have not had the detailed breakdowns required. There is no assurance that fuel dealer sales accurately represent fuel consumption, either. Sales of coal to industrial sources or of wood to residential sources, for instance, may represent only a part of the total fuel consumed, because much of the fuel consumed may not come from retail dealers. The second method below should be used for those cases in which fuel dealers cannot provide the detailed breakdowns of total fuel sales by county. It should be emphasized, however, that information provided by dealers, although perhaps incomplete, can provide insights into fuel use patterns that would not be discovered by the second method.

5.5.3.2 Bureau of Mines Published Data Method - The Bureau of Mines of the U. S. Department of the Interior publishes annual data on fuel sales and distribution. The advantages to the use of this information are that the data are reported nationwide, are readily available because they are published, and are updated every year. The drawback to the use of this material is that fuel data are reported by states only, and often are not broken down into the desired source categories. County totals must be estimated by apportioning state totals. This geographical apportioning step, which is not necessary for the fuel dealers method, decreases the accuracy by which area source fuel totals can be determined. The geographical apportioning techniques discussed in the next section are the best available, however, and are the standard techniques used to apportion Bureau of Mines data.

5.5.4 Apportioning Fuel Consumption

To complete the area source form, the county fuel consumption totals must be assigned to the proper source categories. If fuel dealers furnish county totals by source category, no problems are involved; but if only county sales totals can be obtained from fuel dealers or if Bureau of Mines data must be used, then apportioning techniques are required. Geographical apportioning techniques for use with Bureau of Mines figures, and source category apportioning techniques for use with either data collection method will be discussed.

5.5.4.1 Geographical Apportioning Techniques - Unique means of apportioning state totals to counties are to be used for each source category. Some of the coal data given by the Bureau of Mines are reported for groups of states only.[3] To separate the group total into individual state totals, the group total should be distributed to states according to population. For instance, if the population of State A is 30 percent of the total population for States A, B, and C for which one coal consumption figure is given, then 30 percent of the coal consumption should be assumed to take place in State A.

5.5.4.1.1 Residential fuel use - State totals for residential fuel use can be apportioned to counties by the number of dwelling units using each fuel per county. Dwelling unit information is available from the 1970 Census of Housing[7] and should be applied according to the following formula:

$$\text{County residential fuel total} = \text{State residential fuel total} \times \frac{\text{County dwelling units}}{\text{State dwelling units}}$$

The county and state dwelling units above refer to the number of dwelling units using each type of fuel for space heating. The Census of Housing reports the number of dwelling units using each type of fuel in three different tables. One table reports the figures for the entire state, one lists the totals for counties contained in standard metropolitan statistical areas, and the other reports totals for counties outside of SMSA's. The fuel category "utility gas" refers to natural gas, and the category "bottled, tank, or LP gas" is for LPG. The categories "other fuel" and "none" are also given. In tables where wood is not listed, assume "other fuel" to be wood. In tables where wood is listed, disregard the total given for "other fuel." The total number of dwelling units burning wood, as determined by adding up the totals for each county, must equal the given state total. If not, the totals for the counties in which "other fuel" was considered to be wood must be adjusted proportionately so that the given state total equals the total obtained by adding up the individual county totals.

5.5.4.1.2 Commercial and institutional fuel use - State fuel totals for this source category can best be apportioned to counties according to population, as given in the 1970 Census of Population.[2]

$$\text{County fuel total} = \text{State fuel total} \times \frac{\text{County population}}{\text{State population}}$$

5.5.4.1.3 Industrial fuel use - County industrial fuel totals are proportional to the total number of manufacturing employees per county, as given in the 1967 Census of Manufacturers, "Area Statistics."[8]

$$\text{County industrial fuel total} = \text{State industrial fuel total} \times \frac{\text{County manufacturing employees}}{\text{State manufacturing employees}}$$

5.5.4.2 Source Category Apportioning Techniques - It is often necessary to apportion state or county fuel totals to residential, commercial-institutional, and industrial source categories. The prescribed methods for distributing each fuel total to source categories are presented below.

5.5.4.2.1 Anthracite coal - State totals for major anthracite-consuming states should be obtained from Minerals Yearbook[3] or Distribution of Pennsylvania Anthracite.[9] Anthracite may be used by all three source categories. The stepwise procedure for determining the use by each source category is presented below.

Step 1: Determine the total area source consumption of anthracite by subtracting the amount used by point sources from the state total given by the Bureau of Mines.

Step 2: Determine the residential consumption of anthracite (columns 50 through 53, card 1) according to the following method.[10] The residential anthracite consumption is a product of four factors:

1. The number of dwelling units using coal as heating fuel.
2. The coal heating requirement factor.
3. The average annual heating degree-days.
4. The correction factor for the number of rooms per dwelling unit in the study area.

The number of dwelling units heating with coal should be obtained from the 1970 Census of Housing.[7] The heating requirement factor for coal is 0.0012 ton coal per dwelling unit per degree-days. The average annual heating degree-days should be obtained from Local Climatological Data.[11] For a state, an average degree-day value compiled from all the reporting stations in the state for the year of interest should be used. For a county, the degree-day value given by the nearest reporting station should be used. The correction factor is the average number of rooms per dwelling unit, as given in the Census of Housing,[7] divided by 5--the national average for the number of rooms per dwelling unit.

A sample calculation for State X would be as follows:

Number of dwelling units heating with coal = 10,000,
State average annual heating degree-days = 5,000,
State average rooms per dwelling unit = 4.5.

The residential use of anthracite coal is calculated:

$$\text{State total} = (10{,}000 \text{ dwelling units}) (0.0012 \text{ ton coal/dwelling unit-degree-day}) (5{,}000 \text{ degree-days}) \left(\frac{4.5 \text{ rooms}}{5.0 \text{ rooms}}\right) = 54{,}000 \text{ tons coal/year.}$$

Step 3: The commercial-institutional (columns 10 through 14, card 2) and the industrial (columns 36 through 41, card 2) area source consumption of anthracite can be determined as follows: Subtract the calculated residential consumption figure from the anthracite area source total. All of the remaining anthracite should be assigned to the commercial and institutional category if no anthracite is consumed by industrial point sources. Assign 60 percent of the remaining amount to commercial and institutional sources and 40 percent to industrial sources if a significant amount of anthracite is consumed by industrial point sources.[3]

5.5.4.2.2 Bituminous coal - State totals for bituminous coal should be obtained from Minerals Yearbook[3] or Coal-Bituminous and Lignite.[12]

Step 1: The amount consumed by residential users (columns 54 through 58, card 1) must be determined. In some states anthracite coal is not available.[3] For these areas all of the residential coal consumption should be considered bituminous coal, and the total consumption can be calculated according to the same procedures given for anthracite coal. For the states in which anthracite coal is available, estimates of the number of dwelling units heating with anthracite and the number heating with bituminous must be made. Local coal dealers may be able to state what percent of their customers are sold anthracite, and what percent of their customers are sold bituminous. If not, the bituminous coal portion can be estimated by assuming that the Bureau of Mines figure given for distribution of bituminous coal to retail dealers[3] is the total state consumption of bituminous coal by residential sources. The difference between the amount calculated by the method based on the number of dwelling units and the Bureau of Mines retail dealers figure should be considered to be the anthracite portion.

Step 2: If the residential bituminous coal consumption is less than the Bureau of Mines retail dealers bituminous coal figure for the state, assign the difference to the commercial and institutioanl source category (columns 15 through 19, card 2). If the residential bituminous coal consumption is not less than the retail dealers figure, assume commercial and institutional bituminous coal consumption to be negligible.

Step 3: The state total for all industrial bituminous coal consumption is assumed to be the sum of the Bureau of Mines figures for "coke and gas plants" and "all other."[3] The state area source total is determined by subtracting the amount of bituminous coal consumed by industrial point sources from the state total for all industrial bituminous coal consumption. The county area source totals should be entered in columns 42 through 47, card 2.

5.5.4.2.3 Distillate oil - State totals for distillate oil consumption should be determined from Mineral Industry Surveys, "Sales of Fuel Oil and Kerosene."[4]

Step 1: The amount consumed by residential sources (columns 59 through 63, card 1) is estimated by using the number of dwelling units heating with fuel oil and a heating requirement factor of 0.18 gallon oil per dwelling unit per degree-day. The method has been described in detail in the section on anthracite coal.

Step 2: Commercial and institutional distillate oil consumption is the difference between residential consumption and the sum of the figures given for "distillate-type heating oils," "kerosene used for heating," and "distillate used by the military" from Tables 5, 6, and 12 of Reference 4. Any distillate oil consumed by commercial and institutional point sources should be subtracted before the area source total is entered in columns 20 through 24, card 2.

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Step 3: The state industrial area source use of distillate oil is the sum of the figures given for "industrial" and "oil companies" in Tables 8 and 9 of Reference 4, minus the amount consumed by industrial point sources. Enter the area source total in columns 52 through 56, card 2.

5.5.4.2.4 Residual oil - Use the same methods and reference as given for distillate oil. Residential sources (columns 64 through 68, card 1) do not usually consume residual oil. Local oil dealers should be contacted to determine what percent of their residential customers, if any, were sold fuel oil grades 5 and 6. The commercial and institutional area source consumption (columns 25 through 29, card 2) can be determined from figures given in Tables 7 and 12 of Reference 4, and industrial consumption can be determined from residual oil data in Tables 8 and 9 of the same publication. Remember to subtract residual oil consumption by the point sources in each source category from the Bureau of Mines totals to obtain the area source totals.

5.5.4.2.5 Natural gas - Distribution of natural gas by state is given in Table 6 of Reference 5. The proper source category totals are shown. The "commercial-institutional" category is the sum of "commercial" and "other users." Subtract point source use of gas to obtain the area source totals. Enter residential consumption in columns 69 through 73, card 1, commercial-institutional in columns 30 through 33, card 2, and industrial in columns 62 through 66, card 2.

5.5.4.2.6 LPG - In areas where large quantities of LPG are used, significant air pollution emissions can result. LPG can be converted to "equivalent natural gas" on the basis of resulting emissions. Assume that 1 gallon of LPG equals 100 cubic feet of "equivalent natural gas." LPG use by state is given in Table 2 of Reference 6. The "residential and commercial" category of Table 2 can be separated into residential and commercial-institutional by assuming that the ratio of residential to commercial use of LPG is the same as the ratio of residential to commercial use of natural gas, as given in Reference 5. The "equivalent natural gas" should be added to the area source totals for residential, commercial-institutional and industrial natural gas.

5.5.4.2.7 Wood - No published data are available for wood consumption by source category. Residential use (columns 74 through 77, card 1) can be estimated by multiplying the number of dwelling units heating with wood by the heating requirement factor of 0.0017 ton of wood per dwelling unit per degree-day. Wood may also be used industrially (columns 67 through 69, card 2) by those wood-processing operations that are not included as point sources. Wood use by these sources should be estimated from the point source questionnaires for these smaller wood-processing operations. Space has also been provided (columns 34 and 35, card 2) for commercial-institutional use of wood. No reporting techniques for consumption of wood by users in this category are available, however. Thus, a figure for commercial-institutional consumption of wood can be entered only if adequate local data from fuel dealers or other reliable sources are available.

5.5.5 Applying Fuel Consumption Apportionment Methods

It should be evident from the discussion of the two methods for determination of area source fuel consumption that neither method can be used exclusively to produce an accurate, comprehensive source inventory. The two methods must be used together, making best use of the advantages offered by each method to offset the deficiencies in the inventory that would result from use of one method alone. This section will deal with how to apply both methods to the best advantage, and the assumptions to be made when difficulties are encountered in the use of each method. A discussion is presented for each fuel.

5.5.5.1 Coal Data - In the past, Bureau of Mines data have been relied upon mainly because coal dealers have not been able to furnish sufficiently detailed information. The state totals given by the Bureau of Mines should be regarded as accurate. When these totals are apportioned to counties, they may not be as accurate as the data provided by local dealers. The chief value of data from coal dealers is usually as a check on the Bureau of Mines figures and as an indicator of local use patterns that would not be discovered by using Bureau of Mines data alone. For instance, local dealers should be able to furnish the percent of their customers that burn anthracite and the percent that burn bituminous. Their fuel sales figures may reveal that all anthracite is consumed in only a few counties in the state, rather than distributed among all the counties, as would be predicted by apportionment of Bureau of Mines figures. If coal consumption totals obtained from dealers do not agree with Bureau of Mines figures, it is best to assume that the total state consumption given by the Bureau of Mines is correct. The distribution to source categories, particularly residential and commercial-institutional, may be more accurately provided by dealers, however. If the residential and commercial-institutional area source totals provided by dealers are regarded as correct, the industrial area source total can be adjusted, if necessary, so that the state total equals the figure given by the Bureau of Mines. If fuel dealer totals are given only for groups of counties, individual county totals can be obtained by using the appropriate apportioning technique. For residential and commercial-institutional sources, county totals derived by this method should still be regarded as more accurate than the apportioned Bureau of Mines data. A judgment must be made, however, as to whether the data provided by dealers are truly accurate. If the dealer provides data that are inaccurate or incomplete, use the Bureau of Mines data.

5.5.5.2 Fuel Oil Data - Many of the remarks made for coal data also apply for fuel oil. Distribution to source categories as provided by fuel dealers may be regarded as more accurate than the apportioned Bureau of Mines data, but the state totals reported by the Bureau of Mines should be regarded as correct. One of the chief values of dealer contacts is in determining if residual oil is used residentially. If fuel oil dealers can state what portion of their residential customers are sold residual oil for heating, then a portion of the total fuel oil consumed by residential sources, as predicted by the calculation based on number of housing units, can be assigned to residual oil.

5.5.5.3 Natural Gas - Few problems should be encountered in determining natural gas use by county. If gas dealers provide records of their sales to each source category (by county), this information should be used. If the gas dealers do not provide this information in sufficient detail, the Bureau of Mines figures should be used.

5.5.5.4 Other Fuels - LPG use by county can be determined from local dealers and Bureau of Mines data. The same criteria given for natural gas data also apply for LPG. Wood use can best be determined by the calculation based on number of dwelling units using wood as heating fuel, because much of the wood consumed may not be delivered by dealers. Use of coke and process gas can be determined only from available local information.

It should also be pointed out that the general approach to be taken is to minimize duplication of work and the number of calculations necessary. Mention has been made previously of the methods that should be used to determine area source totals. Generally, it is most convenient to start with Bureau of Mines data and determine statewide area source totals for each fuel by subtracting the amounts consumed by point sources. Any apportioning to source categories that is necessary can then be done, until statewide area source fuel consumption totals for each source category are obtained. Next, local dealer information can be compared with the Bureau of Mines data by apportioning the state area source totals to the counties for which local dealer data are available. It can then be decided, according to the criteria previously discussed, which are more accurate--the local dealer data or the Bureau of Mines data. If fuel dealer data are used, required adjustments can be made in the state area source totals so that the sum of the individual county fuel use totals does not exceed the state totals determined from the Bureau of Mines data. Finally, the adjusted statewide area source totals can be apportioned to the remaining counties for which fuel dealer information was not available.

5.6 SOLID WASTE DISPOSAL (COLUMNS 10 THROUGH 42, CARD 3)

The area source solid waste category includes on-site refuse disposal activities by residential, industrial, and commercial-institutional sources. On-site incineration refers to disposal in a small incinerator. This includes backyard burners, industrial incinerators, and incinerators at food and department stores, hospitals, and schools. On-site open burning refers to unconfined burning of waste such as leaves, landscape refuse, or other rubbish. For emission inventory purposes, only solid waste that is burned is of interest. Unfortunately, very little quantitative information about on-site solid waste disposal is available.

Two methods of collecting data are available:

1. Solid waste surveys: Some areas have conducted comprehensive surveys of solid waste disposal practices. If such a survey is available, it should be used to estimate solid waste quantities. Many such surveys cover only collected waste, however, and are of limited value for determination of on-site waste disposal quantities.
2. Per-capita generation rate: Average factors shown in Table 5-1 were derived from the 1968 National Survey of Community Solid Waste Practices.[13, 14]

Table 5-1. NATIONWIDE AVERAGE EMISSION FACTORS FOR INCINERATION AND OPEN BURNING
(lb/person-day)

Source category	Emission factor
Industrial on-site incineration	1.6[a]
Industrial on-site open burning	0.8[a]
Residential and commercial-institutional on-site incineration	0.65
Residential and commercial-institutional on-site open burning	0.5

[a] Unit refers to pounds per urban person per day.

No apportioning of state totals is necessary if solid waste quantities are determined from a local survey or a per-capita generation rate. The area source quantities should be entered in columns 10 through 42, card 3 of the form. Method 1 should be used, if at all possible, because method 2 does not take into account local variations in solid waste disposal practices. The factors shown for method 2 represent national averages only. They may be very inaccurate predictors of solid waste quantities in local areas. Note that, when method 2 must be used, the industrial factors are based on urban population, and the residential-commercial-institutional factors are based on total population. The necessary population data must be obtained from the 1970 Census of Population.[2]

The area source form also requires that the residential and commercial-institutional categories be reported separately. If better information from solid waste surveys cannot be obtained, assume that 75 percent of the residential-commercial-institutional total was generated by residential sources.[14]

In some areas, open burning and on-site incineration are regulated and may be prohibited. If one or both of these practices is prohibited, the corresponding generation factor(s) should not be applied. Under such circumstances assume that the solid waste that would normally be allotted to on-site disposal is handled by some other method, such as land-filling, that would not result in air pollutant emissions. For such cases, a value of zero should be entered, where appropriate, on the area source form.

5.7 MOTOR VEHICLE FUEL DATA

5.7.1 Gasoline-Powered Motor Vehicles

This area source category includes all highway use of gasoline by light-duty vehicles (under 6,000 pounds gross vehicle weight) and heavy-duty vehicles (over 6,000 pounds gross vehicle weight). Light-duty vehicles include automobiles and small trucks, while heavy-duty vehicles include larger trucks and buses. Three data collection methods for estimating gasoline-powered vehicle miles of travel (VMT) are given in order of decreasing accuracy.

1. Measured vehicle miles: Emissions from motor vehicles are best estimated using measured VMT. Total VMT can be obtained from traffic surveys conducted by state highway departments or local transportation agencies. Normally the total VMT will include diesel VMT as well as gasoline VMT. Because only gasoline VMT should be entered in columns 52 through 76 of card 4, diesel VMT included in the total VMT should be accounted for. If actual vehicle-mile information is unavailable from these surveys, VMT can be estimated from traffic counts or traffic flow maps. This is accomplished by multiplying the traffic volume by the length of roadway. Since vehicle emission rates vary appreciably with average speed, VMT data should be obtained by roadway type. On the basis of average speed, roadway types can be classified as: limited access (greater than 50 mph), rural roads (45 mph), suburban roads (35 mph), and urban streets (25 mph or less). In addition to the total number of VMT, a breakdown of heavy-duty miles of travel and light-duty miles of travel should be obtained from the traffic survey. The breakdown of vehicle miles by average speed should also be determined for grid zones, if possible. This procedure is described in Chapter 7.

2. County gasoline sales data: Some state tax departments compute gasoline sales by county. The county gasoline sales can be converted to VMT by multiplying by 12.2 miles per gallon.[15]

3. Published gasoline sales totals by state: If neither of the above methods can be used, state sales of gasoline for highway use may be obtained from Highway Statistics.[16] Statewide sales can then be apportioned to counties.

To complete the area source form by means of the first method above, gasoline vehicle miles of travel by roadway type are obtained by county and entered on the area source form (columns 52 through 76, card 4). If it is not possible to determine vehicle miles for each of the types of roads, the vehicle miles should be broken down at least into the urban and rural components. Before attempting to calculate the values for columns 52 through 76, card 4 of the area source form, total diesel-powered VMT must be subtracted from total VMT. Determination of total diesel VMT is described in Section 5.7.2.

If the measured vehicle mile method is used, the light-duty/heavy-duty fuel consumption breakdown should be calculated. This can best be accomplished by using gasoline sales data according to the method described in the following paragraph.

If the second method is used to complete the area source form, total county gasoline VMT, computed by assuming an average of 12.2 miles per gallon, is divided into heavy-duty miles and light-duty miles. It is assumed that approximately 11 percent of the total miles in the county are heavy-duty vehicle travel. After heavy-duty and light-duty VMT are determined, they are converted to gasoline consumption by using 13.6 miles per gallon for light-duty vehicles and 8.4 miles per gallon for heavy-duty vehicles.[15] The urban-rural breakdown of vehicle miles by county must be estimated. The best method to use is the urban-rural population breakdown given in the 1970 Census of Population.[2] The population distribution code (column 77, card 3) shows the urban component of the total county population. If this value is 2, for example, assume that 20 percent of the VMT are urban and 80 percent are rural. If the population distribution code is 3, for example, assume 30 percent of the VMT are urban, etc. The light-duty and heavy-duty gasoline consumption figures are entered in columns 43 through 54, card 3 of the area source form. The rural and urban VMT are entered in columns 58 through 63 and 70 through 76, respectively, on card 4.

In the third method, gasoline consumption must be apportioned to counties. The best means for apportionment is to use county service station sales data from the 1968 Census of Business[17] according to the following formula:

County gasoline sales =

$$\frac{\text{County service station sales, \$}}{\text{State service station sales, \$}} \times \text{State gasoline sales, gal}$$

If adequate data from the 1968 Census of Business[17] cannot be obtained, population data from the 1970 Census of Population[2] should be used to apportion state gasoline sales to counties. Once this is completed, method 2 above is used to determine the values for the area source form.

The first is by far the most accurate of the three methods for the determination of gasoline motor vehicle emissions. Methods 2 and 3, based on gasoline sales, are inferior to the vehicle-mile method--method 1--because they assume that all gasoline sold in the county is consumed on the roads in the county. The vehicle-mile method measures actual vehicle travel. Another problem with the gasoline sales method is that the urban-rural breakdown of VMT must be estimated. It should be emphasized that only measured vehicle miles should be entered on the area source form. Calculated vehicle miles, based on gasoline sales data, are to be used only as described in the second method for determining light-duty/heavy-duty vehicles breakdown. If no measured vehicle miles are available, columns 52 through 76 of card 4 must be left blank.

5.7.2 Diesel-Powered Motor Vehicles

This area source category includes heavy-duty trucks and buses using diesel fuel. Again, three data collection methods can be used:

1. Vehicle miles: The best method is to obtain measured vehicle miles traveled by diesel-powered vehicles. If this information is not available, diesel vehicle miles must be calculated from the county diesel fuel sales determined by method 2 or 3 below. Diesel VMT is obtained by multiplying the diesel fuel sales by 5.1 miles per gallon.[16] If method 1 was previously used for gasoline-powered vehicles, this method must also be used for diesel-powered vehicles to account for diesel VMT included in the total VMT.

2. County diesel fuel sales: If vehicle miles cannot be obtained, gallons of diesel fuel sold per county should be obtained from the appropriate state agency or oil dealers' association.

3. Published statewide sales figures: If neither of the above methods can be used, consider the figure for "on-highway use of special fuels" reported in Highway Statistics[16] to be the amount of diesel fuel sold statewide. Apportion this total to counties using the same apportionment method as for gasoline VMT.

When the vehicle-mile method for completing the area source form is used, the only quantity to be entered on the area source form is highway diesel fuel consumption. Diesel VMT needs to be computed only to account for the diesel portion of the total VMT. The county diesel fuel consumption should be coded in columns 60 through 64 of card 3.

Obtaining measured diesel vehicle miles is by far the best method. Data may be available that indicate the percent of the total VMT by diesels. As was indicated in methods 2 and 3 for gasoline-powered vehicles (Section 5.7.1), assume that diesel fuel purchased in the county is consumed in the county. This is an even more gross assumption with diesels, however, because most diesel traffic is through-traffic.

5.7.3 Off-Highway Fuel Use (Columns 55 through 59 and 65 through 67, Card 3)

Off-highway internal combustion machines use both gasoline and diesel fuel. Off-highway gasoline-powered machines consist of farm tractors, lawnmowers, snowmobiles, etc. Off-highway diesel-powered machines include farm tractors, construction equipment, emergency generator power units, compressor engines, etc. All off-highway equipment is uncontrolled from an exhaust emission standpoint. Two data collection methods can be considered:

1. Fuel consumption factors:
   a. Gasoline fuel use: Farm tractor fuel consumption can be calculated by applying an annual per-tractor fuel consumption rate (1,000 gallons/tractor-year) to the number of tractors in use. The total consumption for all other off-highway gasoline-powered equipment may be calculated by applying a factor, based on population, of 13 gallons per person.
   b. Diesel fuel use: Farm tractor diesel fuel consumption is about 1,000 gallons per tractor annually. The total consumption for construction equipment is approximately 5,000 gallons annually per non-building construction employee. All other off-highway diesel fuel consumption may be calculated by applying a factor of 7.4 gallons per capita annually.
2. Fuel totals by state: Total off-highway use of gasoline and diesel fuel by state can be obtained from publications by the Bureau of Mines[4] and the Department of Transportation.[16]

If method 1 is used, off-highway gasoline consumption by county is calculated by summing farm tractor gasoline consumption and all other gasoline consumption. Total tractors (gasoline and diesel) by county are reported in the Census of Agriculture.[18]

About 60 percent of all tractors are gasoline-powered. The total fuel use can be calculated by multiplying the number of gasoline-powered tractors in the county by 1,000 gallons per tractor-year. All other off-highway gasoline consumption is the product of 13 gallons per capita-year and the population of the county.[2] Off-highway gasoline consumption is entered in columns 55 through 59 of card 3 on the area source form.

Using method 1, the total off-highway diesel fuel consumption by county is the sum of farm tractor usage, construction equipment usage, and all other diesel-powered equipment usage. Thirty-five percent of all tractors reported in the Census of Agriculture[18] are diesel-powered. The total farm tractor population is made up of 60 percent gasoline tractors, 35 percent diesel tractors, and 5 percent LPG tractors.

The diesel fuel usage by farm tractors is the product of the number of diesel tractors in the county and 1,000 gallons per tractor-year. The number of non-building construction employees is reported in County Business Patterns.[19] Construction equipment diesel fuel use is the product of the number of non-building construction employees in the county and 5,000 gallons per employee-year. The total for all off-highway diesel fuel use is entered in columns 65 through 67 of card 3 on the area source form.

If method 2 is used, the state totals are apportioned to the county based on the ratio of the county population to the state population.[4] The resulting quantities are entered on the area source form (gasoline in columns 55 through 59; diesel in columns 65 through 67).

Method 1 is the recommended method. The published statewide non-highway fuel totals for method 2 are determined from taxes refunded to individuals using taxed fuels for off-highway purposes. Because all individuals using fuels off-highway do not apply for tax refunds, the state totals are likely to be underestimated. It is also difficult to apportion statewide off-highway fuel totals to counties in a meaningful manner. Population apportionment, for instance, results in high farm tractor fuel consumption in large urban areas. Method 1 will be expanded and improved upon as more refined data on engine fuel consumption become available. State snowmobile registrations, for example, will allow this source to be handled separately and, therefore, more accurately.

5.7.4 Railroads (Columns 68 through 72, Card 3)

This category, which is concerned with fuel consumption by railroad locomotives, also includes the fuel used to heat railroad stations and workshops. The latter fuel use will be much less than that of locomotives and is difficult to separate from the total railroad fuel use. Hence, the railroad category is considered to be the fuel consumption by locomotives, although it does include small amounts of fuel used for space heating. The primary fuel consumed by railroads is distillate oil (diesel fuel), but smaller amounts of residual oil and coal are also used. Two data collection methods are available:

1. Contact rail lines: Rail lines may be able to furnish state totals for their fuel use, but it is unlikely that they will be able to provide information by county.
2. Bureau of Mines data: Sales of fuel oil to the railroads for use in each state are given in Table 10 of Mineral Industry Surveys.[4]

For completion of the area source form, the county fuel consumption by railroads should be entered in columns 68 through 72, card 3. State fuel totals can be apportioned to counties as follows:

1. By miles of track per county as determined from detailed state maps or obtained from the rail lines.
2. By county population as given in the 1970 Census of Population.[2]

If county fuel totals are obtained from rail lines, this information should be used. In most cases it will be necessary to apportion a state total, however. Rail line figures should be used in preference to Bureau of Mines state totals, because some preliminary apportioning may be accomplished by doing so. Fuel use by a rail line can be assigned to only that portion of the state in which the rail lines operate.

Apportionment by miles of track per county is the preferred method; however, track miles in railroad yards often cannot be determined if state maps must be used to estimate track mileage. Because operations in rail yards are usually heavier than on main-line track, emissions from yard operations may be quite significant. If yard track mileage cannot be obtained from rail lines, the yard mileage can be roughly accounted for by doubling the measured track mileage in counties where it is known that there are significant yard operations. The population apportioning technique should be used only when it is impossible to use track mileage. This technique assumes that most yard operations take place in large cities, an assumption that may or may not be true depending on the state being considered.

Residual oil, which may be used by railroads, can be accounted for if Bureau of Mines figures are used, by adding the state residual oil total for railroads to the distillate oil total before apportioning to counties. Use of coal by railroads, which can be considered negligible, does not need to be reported.

5.7.5 Vessels (Columns 24 through 40, Card 4)

This source category includes ocean-going ships, river vessels, and small pleasure craft used on lakes and rivers. A more detailed discussion of each type of vessel and the methods used to obtain fuel consumption data are presented below.

Three data collection methods are available:

1. Coal-powered vessels: There are still a few vessels, notably in the Great Lakes region, that burn anthracite coal. No reliable method for estimation of emissions on a local basis for these vessels is currently known, because only nationwide fuel totals are available.[3] Thus information on local fuel consumption can be obtained only from estimates made by port authorities or ship operators.
2. Gasoline-powered vessels: This category includes small craft operated by inboard, outboard, or inboard-outboard motors on lakes and rivers. Gasoline consumption can be estimated by using a factor of 160 gallons of gasoline per boat registration per year. This factor was derived from information on average annual operating hours, average horsepower per vessel, and average fuel consumption per horsepower-hour of operation. The estimate also approximately accounts for any non-motorized boats that may be included in the state total of registrations and for boats with small outboard motors that may not be registered.[20] State boat registration should be obtained from the appropriate state agency, such as the State Department of Recreation or Fish and Game Department, etc.
3. Fuel oil (including diesel)-powered vessels: Fuel consumption by these vessels, which are the major vessels subcategory of interest, includes the fuel used by large cargo and passenger ships, oil tankers, tugboats, and all other steamships and motorships that use fuel oil. Fuel consumption totals can be obtained by:
   a. Questionnaire surveys of shipping and tugboat companies and contact with the local port authorities. This method would provide the most accurate local data for fuel consumption rates of many of the vessels in the area. Such a survey is not often comprehensive enough to include all vessels, however, because many vessels move in and out of the port area during the year and would be difficult to contact.

   b. Use of vessel movement data supplied by the U. S. Army Corps of Engineers,[21] together with fuel consumption factors and Bureau of Mines fuel consumption figures.[4] This method is much easier to implement than a questionnaire survey, and may be almost as accurate despite the generalizations that must be made to effect its use. This method is described in detail later in this chapter.

c. Use of Bureau of Mines figures only. State totals for fuel oil sold to vessels are given in Table 11 of Reference 4. Not all the fuel sold for vessel use is by any means consumed within the state boundaries, however. Much of the fuel may be consumed far out at sea and not in a port or waterway area. If it is assumed that 75 percent of the distillate oil figure given in Reference 4 and 25 percent of the residual oil total are consumed in ports and waterways within the state, a rough estimate of vessel fuel oil consumption can be obtained. This method should not be used in conjunction with a detailed emission inventory, however, and is useful mainly to obtain an order-of-magnitude emission estimate from vessel operations.

Unique apportioning methods are used for each type of vessel when completing the area source form:

1. Coal-powered vessels: Because fuel consumption data on a local basis are very limited for coal-powered vessels, county totals may have to be obtained by apportioning state or regional totals. Anthracite coal use should be assigned to counties with major ports, according to tonnage handled in the ports. These data are available from Waterborne Commerce of the United States,[21] published by the U. S. Army Corps of Engineers for all ports, and from World Almanac[22] for major ports only. It may be that coal use is available only as a total for a multistate area. In this case it is necessary to assign fuel use to individual ports as a proportion of the total tonnage handled by all major ports included in the multistate area.

2. Gasoline-powered vessels: Gasoline use could be apportioned to counties according to boat registrations per county, but this would not be an accurate method because many boats are not used primarily in the county in which they are registered. Instead, the total gasoline consumption predicted by the state total of boat registrations should be apportioned to counties on the basis of inland water surface area. County inland water areas should be determined from the Bureau of the Census' Area Measurement Reports.[23]

3. Fuel oil-powered vessels: If fuel consumption totals are determined from a questionnaire survey, the fuel oil consumption figures should simply be assigned to the counties where the vessels are operated. If vessel movement data obtained from Reference 21 must be used, extensive apportioning measures

are necessary. The apportioning method becomes somewhat involved because both underway and dockside emissions should be considered.

Underway emissions include the emissions that occur when a vessel is moving under its own power through a waterway and when it is maneuvering into its dock space. The average fuel consumption rate during these periods for steamships (predominantly residual oil users) is 44 gallons per nautical mile, and for motorships (predominantly diesel fuel consumers) the average fuel consumption rate is 19 gallons per nautical mile.

In-port, or dockside, emissions occur when a ship operates its engines or boilers when in port to provide power for the ship's utilities. Average fuel consumption rates are 1900 gallons per day of residual oil for steamships and 660 gallons per day for motorships. The local port authority should be able to supply a figure for the number of days, on the average, that a ship remains in port. If not, an average figure of 3 days per vessel should be used.

The complete description of the vessel-movement data method for fuel oil-powered vessels is presented in stepwise form below:

Step 1: Determine in-port fuel consumption.

1. The number of vessels entering a port can be found in Section 2 of parts 1, 2, 3, and 4 of the Waterborne Commerce of the United States.[21] Each part covers a specific geographical area of the United States. Section 2 lists vessel traffic on waterways for self-propelled vessels and non-self-propelled vessels according to type and draft of vessel and direction of trip. For the first step in the determination of inport emissions, select the entries for ports in Section 2, and assume that only self-propelled vessels with a draft greater than 18 feet will be operating under their own power when in port. Determine the number of vessels meeting these conditions that enter each port, and multiply by 3 days per vessel or by a number recommended by the port authority to calculate the number of vessel-days in each port.

2. Vessel-days in port must be distributed between those ships that use residual oil and those that use distillate (diesel) oil. This procedure is illustrated as follows for State X:

   a. From Reference 4, Table 11, the amounts of distillate and residual fuel oils sold for use by vessels in each state can be found for State X.

Distillate oil consumption = 232×10^3 bbl = $9,750 \times 10^3$ gal
Residual oil consumption = $1,000 \times 10^3$ bbl = $42,000 \times 10^3$ gal

b. Convert fuel consumption figures to vessel-days:

$$\text{Distillate vessel-days} = \frac{9,750 \times 10^3 \text{ gal}}{660 \text{ gal/day}} = 14,800 \text{ vessel-days}$$

$$\text{Residual vessel-days} = \frac{42,000 \times 10^3 \text{ gal}}{1,900 \text{ gal/day}} = 22,100 \text{ vessel-days}$$

c. Then total vessel-days = 14,800 + 22,100 = 35,900

$$\text{Percent distillate vessel-days} = \frac{14,800}{36,900} \times 100\% = 40\%$$

d. Then at each port in State X, assign 40 percent of the total vessel-days to motorships (diesel fuel users) and 60 percent to steamships (residual fuel users).

3. Finally, in-port fuel consumption can be calculated by multiplying the total distillate oil vessel-days by 660 gallons per day, and the total residual oil vessel-days by 1900 gallons per day.

Step 2: Determine fuel consumption for vessels underway:

1. Underway emissions will be calculated for diesel fuel use only. In a typical harbor there are tugboats and small craft (draft less than 18 feet) that use diesel fuel. Because most of these do not operate their boilers or engines when in port, most of the emissions occur when the ships are underway. Vessels using residual oil also have underway emissions, which are approximately accounted for when emissions for vessels using diesel fuel are calculated by the technique described below.

2. Calculation of underway fuel consumption:

   a. Subtract the sum for all ports of the in-port diesel fuel consumption from the state total for distillate oil consumption by vessel as given in Reference 4, Table 11.

   b. Distribute the remaining fuel consumption figures to ports and waterways according to tonnage handled, as given in Section 1 of Waterborne Commerce of the United States.[21] Underway fuel consumption totals are assigned to counties using the description of the waterway given in Waterborne Commerce of the United States. In cases where a waterway borders more than one political jurisdiction, divide the emissions equally between jurisdictions. In instances where a waterway, such as a river, passes by a series of counties, assign the emissions to counties according to shoreline mileage along the waterway.

Essentially there is only one suitable method for determining fuel consumption by coal- and gasoline-powered vessels. The method given for each of these types of vessels at present cannot be supplemented by other techniques. If it is possible to determine coal use by vessels according to the method given, the county totals should be entered on the form in columns 24 through 27 of card 4. Likewise, the gasoline consumption total determined by the methods given previously should be entered in columns 37 through 40 of card 4.

Two methods are given that can be used for a detailed survey of fuel oil use by vessels. As mentioned previously, Bureau of Mines data alone are useful only for a rough guess of vessel fuel oil use. Little can usually be gained by using both of the methods for fuel oil consumption by vessels. Vessel-movement data serve as replacements for questionnaires or vice versa. A modified version of the vessel-movement data method would be to contact port authorities for the vessel-movement data. The Waterborne Commerce of the United States[21] data are much more complete, however, and should be used if at all possible. All four parts of Waterborne Commerce of the United States are not necessary for completion of a vessel fuel use inventory. Only that part that covers the geographic area being considered need be used. The choice of either of the first two methods depends on whether sufficiently complete data could be obtained by a questionnaire survey to justify the time required to institute the survey. If detailed data for individual types of vessels such as tugboats, tankers, and cargo ships are desired, questionnaires should be used. If only a reliable estimate of the total fuel consumption by vessel is desired, vessel-movement data are adequate. In any case, the total fuel oil consumption, both residual and distillate oil, should be entered in columns 28 through 36 of card 4. The figures entered on the form should thus be the sum of dockside and underway fuel consumption totals. In the future, should emissions from vessels increase in relative importance, the area source form may be expanded to allow space for both underway and dockside fuel consumption.

5.7.6 Aircraft (Columns 10 through 23, Card 4)

All aircraft operations are considered area sources. The required data are the number of landing-takeoff (LTO) cycles performed annually by military, civil (general aviation), and commercial aircraft. Only two data collection methods are available:

1. FAA published data: Three Federal Aviation Administration publications can be used to determine LTO cycles performed in each county.

   a. *FAA Air Traffic Activity*:[24] This publication gives the number of operations performed by commercial, civil, and military aircraft at airports with FAA-regulated control towers. These airports will include all the major non-military airfields in the United States. An "operation," as defined by the FAA, is either a takeoff or a landing; thus to determine the number of LTO's, the number of "operations" should be divided by two. Totals are given both for itinerant flights, those that terminate at an airport different from the one at which they originated, and for local flights, those that originate and terminate at the same airport. To determine total LTO's for each aircraft category, the sum of itinerant and local operations should be used.

   b. *Military Air Traffic Activity Report*:[25] This publication gives the number of operations by military and civil aircraft performed at military airfields. Follow the same procedure as given for *FAA Air Traffic Activity*[24] to determine LTO's.

   c. *Census of U. S. Civil Aircraft*:[26] This publication can be used to obtain rough estimates of the number of LTO's performed by civil aircraft at airports that do not have FAA-regulated control towers. These airports include the smaller public airports and privately owned airstrips. The *Census of U. S. Civil Aircraft*[26] gives the number of active civil aircraft in each county. These data can be used to estimate LTO's by assuming that the total number of eligible aircraft in each county is approximately equal to the number of daily LTO cycles performed by civil aircraft. This method should be used to estimate LTO's only for airfields not included in *FAA Air Traffic Activity*.[24]

2. Local contacts: The airport owners or operators can be contacted to determine the number of LTO's performed by civil aircraft at airports that do not have FAA-regulated control towers. Airport authorities can also furnish the number of LTO's for any commercial aircraft that land at the airport.

In completing the form, the number of LTO's for civil, commercial, and military aircraft at each airport should be assigned to the proper county, and the totals should be entered in columns 10 through 23, card 4.

Emissions for each aircraft category will be calculated by using average emission factors based on the mix of engine and aircraft types for each category of the U. S. aircraft fleet. As the aircraft mix within each aircraft category changes with time, and as newer information becomes available on the emission rates for each type of aircraft engine, the emission factors will be adjusted to reflect these changes.

LTO cycles at airports with FAA-regulated control towers and at military airfields can be easily determined from the FAA publications cited for method 1. LTO cycles at small airports that do not have FAA-regulated control towers can most accurately be determined by contacting airport officials. Data from the Census of U. S. Civil Aircraft[26] should be used only when adequate information cannot be determined by local contacts. In many areas the majority of civil aircraft operations are performed at airports that do not have FAA-regulated control towers; thus it is definitely necessary to consider the aircraft operations at these smaller airports.

5.8 EVAPORATIVE LOSSES (COLUMNS 41 THROUGH 51, CARD 4)

This source category covers evaporative losses of hydrocarbons and other organic compounds at locations not considered as point sources. There are three main subcategories:

5.8.1 Gasoline-Handling Losses

Gasoline-handling losses include evaporative losses from gasoline marketing operations, i.e., filling losses from loading underground storage tanks at service stations, and spillage and filling losses from filling automobile gas tanks. Gasoline evaporative losses at refineries and bulk terminals should be considered as point sources.

5.8.2 Dry Cleaning Losses

Clothing and other textiles may be cleaned by treatment with organic solvents. The primary source of evaporation losses in the dry cleaning operation is the tumbler through which hot air is circulated to dry the clothes.

5.8.3 Surface-Coating and Miscellaneous Solvent-Use Operations

Included in this category are organic solvent losses from surface-coating, printing, metal-cleaning, and degreasing operations. Surface-coating operations involve primarily the application of paint, varnish, lacquer, or paint primer for decorative or protective purposes. The principal types of industries engaged in surface-coating operations are automobile-assembly factories, aircraft companies, container manufacturers, furniture manufacturers, appliance manufacturers, job enamelers, automobile repainters, and plastic-products manufacturers. In many industries, metal-fabricated products must be cleaned or degreased by washing with an organic solvent before final surface finishing can be completed.

Three data collection methods can be used:

1. Gasoline-handling losses can be calculated if the gasoline sales total for each county is known. If this total has not already been determined for motor vehicle emission estimates (columns 43 through 59, card 3), it should be calculated according to the methods given for on-highway motor vehicles and for off-highway gasoline use.
2. Evaporative losses for solvent-use operations can best be determined by a questionnaire survey of all suspected solvent users. Information required is the amount of solvent purchased per year in tons. If figures are available only in gallons, the average density (pound per gallon) of the solvents used should also be obtained and converted to tons.
3. An alternate method, which is not as accurate as a survey but much easier to employ, is to assume that solvent use is proportional to population. For dry cleaning operations, use of either of two factors, 2 pounds of solvent evaporated per person per year for moderate climates and 2.7 pounds per person per year for colder climates, will provide reasonable estimates. Emissions from surface-coating and degreasing operations are more difficult to estimate, however. A figure of 30 pounds per person per year has been proposed, but this estimate was derived from data obtained only in large cities, where higher-than-average concentrations of industries involved in surface-coating operations would be located. Thus, the graduated scale shown in Table 5-2, based on county population obtained from the *1970 Census of Population*,[2] is recommended for estimation of other solvent-use evaporative losses.

Table 5-2. SOLVENT-USE ESTIMATES

County population	Solvent used, lb/capita-year
Less than 100,000	3
100,000 - 500,000	8
500,000 - 1,000,000	18
More than 1,000,000	28

In completing the form, the total county gasoline sales (the sum of both on-highway and off-highway fuel consumption) should be entered in columns 47 through 51 of card 4. The total solvent use (the sum of the totals for dry cleaning, surface-coating, and degreasing operations, and any miscellaneous solvent use) should be entered in columns 41 through 46 of card 4. The amount of solvent purchased per year is assumed to be the amount evaporated. If further information becomes available to indicate that this is not the case, any changes can be accounted for by adjusting the solvent evaporation emission factor contained in the emission factor file. If actual data concerning solvent use can be obtained, this information should be recorded on the area source form. Otherwise the per-capita solvent-use factor should be employed. If an average density of the solvent used is not supplied, an estimate of 6.7 pounds per gallon should be used to estimate the tons of solvent purchased.[27, 28]

5.9 MISCELLANEOUS SOURCES

Each of the source categories contained in this section can produce large quantities of air pollutant emissions. The techniques for collection of the required data and estimation of emissions are normally not as refined as the methods for other area sources, however. Each type of source included in this section is discussed individually, and the best available means for making emission estimates are presented. The miscellaneous sources are characterized by intermittent emissions, rather than more or less continuous emissions that are characteristic of the other source categories. This means that even though the total emissions contributed by these sources may be relatively small, on particular days their contributions to the total emissions can be quite significant.

1. Forest fires (columns 32 through 41, card 5): Emissions from forest fires can be very significant. Estimates of the quantity and type of growth burned should be available from the U. S. Forest Service, state forestry or agriculture departments, or local fire protection agencies. In addition, the U. S. Forest Service annually publishes Wildfire Statistics,[29] which gives the total acreage burned for each state; however, this document does not provide data on acreage burned by counties. For this reason, it is much better to consult with local officials for estimates of acreage burned. If it is not possible to obtain sufficient information from local officials, the state total from Wildfire Statistics should be apportioned to counties according to forest acreage per county. If this information is not available from the appropriate state or local agency, the total acreage burned can be divided equally between counties with significant forest acreage, as shown on state maps.

   The determination of tons of growth burned per acre is equally important. Local officials should be contacted for this information. If they cannot provide an estimate, the factor from Table 5-3 that best describes the growth burned should be selected.

Table 5-3. FOREST FIRE ESTIMATES

Growth	Quantity burned, tons/acre
Heavily forested	40
Thinly forested or brushy	20

2. Slash burning (columns 42 through 50, card 5): Waste from logging operations is often burned under controlled conditions both to reduce the potential fire hazard in forests and to remove brush that can serve as a host for destructive insects. Because of the magnitude of this operation in certain areas, if certain meteorological conditions exist when slash burning takes place, a serious air pollution problem can result. Officials of the U. S. Forest Service or state forestry department should be contacted to provide estimates of the area burned and quantity of slash per acre. If an estimate of the quantity of slash burned per acre cannot be obtained from other sources, use the factor of 75 tons per acre.

   Also included under this source category are agricultural field-burning operations such as stubble burning and burning of refuse from land clearing. Because no published information is known to be available on this subject, information must be determined through estimates made by state agriculture departments or extension services. Estimates of acreage and tons per acre burned should be obtained. For grass burning, if a local estimate is not available, a factor of 2.5 tons per acre should be assumed. If agricultural field burning is included with slash burning on the area source form, the quantity-per-acre figure should represent a weighted average for slash burning and agricultural field burning.

3. Frost control (columns 51 through 57, card 5): In some areas orchard heaters may be used on the coldest nights of the year. The county or state department of agriculture will usually have a breakdown of the number and types of orchard heaters that are in use. Data can also be obtained from some of the citrus grove operators in the area. These sources should also be able to furnish the number of nights the units were fired during the year and the approximate length of time each night the units were burning. An estimate should also be obtained of the number of units fired at any one time.

   On the area source form should be entered the approximate number of units that are fired on each night when frost control is required, and the number of days out of the year when such operations take place. If individual county totals are not available, state or area totals should be distributed to counties according to the approximate acreage in each county subject to orchard heating.

4. Structural fires (columns 58 through 61, card 5): Building fires can also produce short-term emissions of air contaminants. The best procedure for determining information for this source category is to contact local fire departments, fire protection associations, or other agencies for an estimate of the number of structural fires that occur in each county during the year. In the absence of such information, it can be assumed that, based on the nationwide figures given by the National Fire Protection Association, an average of four fires per 1,000 population occur each year.

5. Coal refuse piles (columns 62 through 70, card 5): Burning coal refuse piles exist in some areas. The coal refuse piles, which were produced as a result of coal mining operations, were formed from coal refuse and rejected material containing too high a percentage of impurities to be marketed. Over the years, the coal refuse piles may have been ignited by spontaneous combustion or through careless or intentional acts of humans. Bureau of Mines Information Circular 8515[30] gives the location of all known burning coal refuse piles in 1968. This publication also gives the size of each bank in thousands of cubic yards and surface covered in acres. If possible, local officials and owners of the coal piles should be contacted to determine if there has been any change in status of the coal fires since 1968, and to determine if any new fires have started. This updated information can be used in conjunction with the data from the Bureau of Mines publication to estimate the extent of coal refuse fires. The total size, in hundreds of cubic yards, of all burning coal refuse piles in a county should be entered in columns 62 through 67 of card 5, and the total number of burning fires in the county should be entered in columns 68 through 70.

6. Dust emissions (columns 10 through 31, card 5): Dust emissions can result from a variety of operations. Many of the dust emissions are caused by man, but a large portion can be the result of natural events. The principal causes of dust emissions are discussed below.

   a. Vehicle travel on dirt roads (columns 10 through 16, card 5): The information that should be obtained is an estimate of the number of vehicle miles of travel on dirt roads. The state highway department may have made such estimates; if not, it should at least be able to furnish the total mileage of dirt roads in each county. This information can be converted to vehicle miles by estimating the traffic on dirt roads. County road departments can also be consulted to determine miles of dirt roads in each county. The estimate of the traffic on dirt roads should be based on information that can be gained from state or county officials.

b. Aircraft LTO's on dirt airstrips (columns 17 through 21, card 5): At certain small airports, flight cycles may be performed on dirt airstrips. At such locations an estimate of the number of annual LTO cycles performed should be calculated, or obtained from the airport operator. This entry is made to account for dust emissions only. The emissions from the combustion of fuel by the aircraft themselves will be accounted for by the aircraft LTO cycles entered in columns 10 through 23 of card 4.

c. Windblown dust and construction activities (columns 22 through 25, card 5): In some areas large dust emissions are generated as a result of windblown soil. Officials of the appropriate state agency, such as the state department of natural resources or department of agriculture, may be able to furnish estimates of the number of acres in each county that is subject to severe soil erosion. In addition, officials of the local offices of the U. S. Soil Conservation Service should be able to provide the same information. Because such estimates are usually vague, reporting the total acreage to nearest 1,000 acres is sufficient.

   Also, substantial areas may be subject to construction activities that can produce dust emissions. Road construction and large building projects, such as urban redevelopment activities and large housing subdivisions, are the chief locations where significant dust emissions are produced. An estimate of the area subject to such activities can be based on information obtained from the state highway department and local public works departments or similar agencies responsible for regulation of building construction activities. The total area subject to construction activities (to the nearest 1,000 acres) should be included in the total for columns 22 through 26 of card 5.

d. Rock handling and storage (columns 27 through 31, card 5): Usually all rock quarries and other large rock-handling operations will be included as point sources. The area source rock-handling operations would cover any smaller-scale activities, such as small sand and gravel yards, stone products manufacturers, and other mineral products industries that would not be included as point sources. The tons processed by all these small operations should be entered in columns 27 through 31 of card 5. The totals should be determined by adding the totals given on questionnaires for sources that did not qualify as point sources.

5.10 REFERENCES

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6. TRACE-MATERIAL AND HAZARDOUS-POLLUTANT SOURCE CODING

6.1 DESCRIPTION OF TRACE-MATERIAL AND HAZARDOUS-POLLUTANT FILE

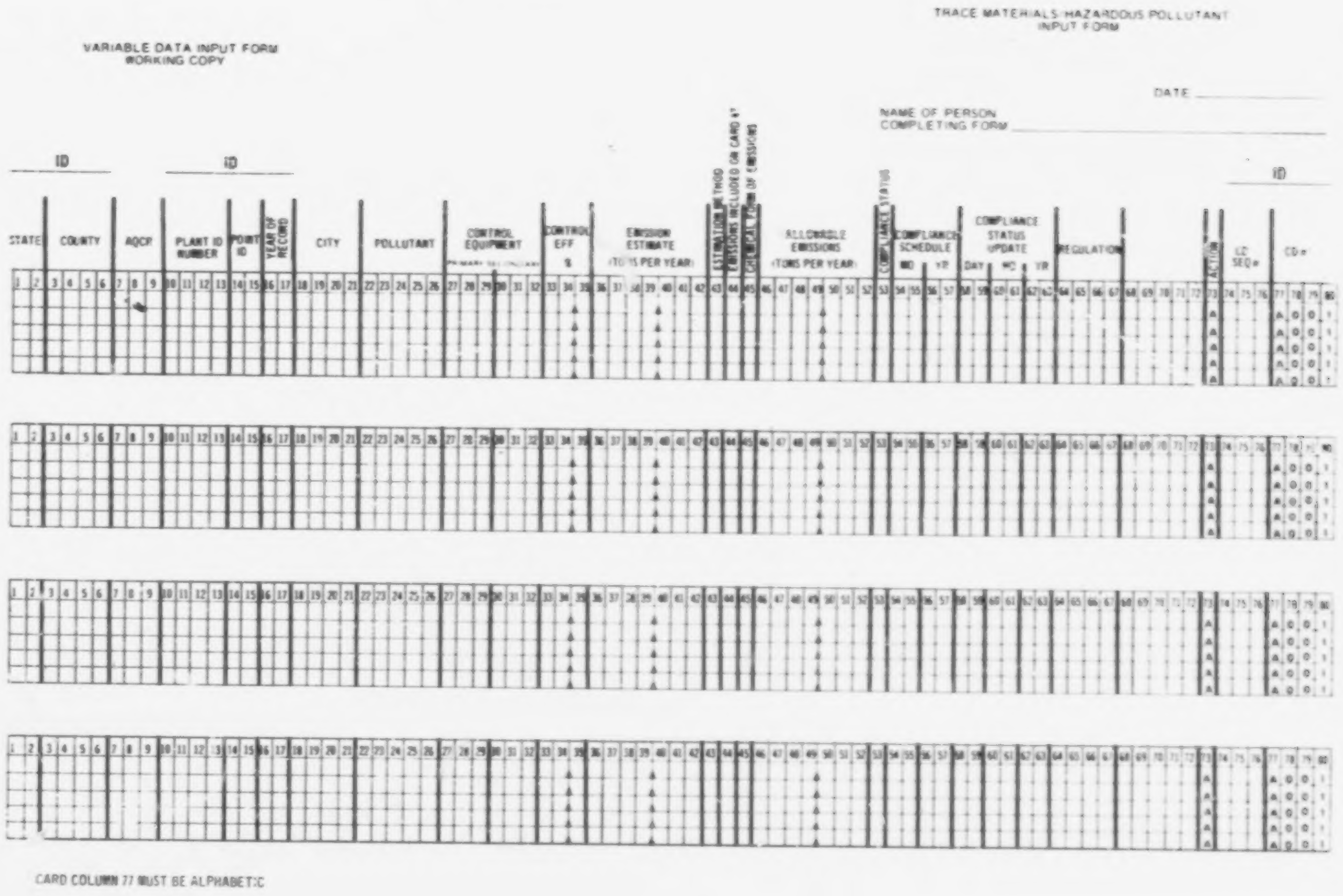
When substantial quantities of trace materials or hazardous pollutants are discharged from a point source, the necessary information must be included in the point source file. Normally, trace-material emission factors for processes will be incorporated automatically in the Source Classification Code File for sources discharging nominal amounts of trace materials. Many sources of concern emit only trace materials, however, and must therefore be described in greater detail (e.g., beryllium manufacturers and users). Special source inventories are now being conducted to identify prime emitters of asbestos, lead, mercury, and beryllium throughout the nation. Additional point source coding forms must be completed for each of these sources to supplement cards 1 through 6 on the original point source coding form. The supplemental forms are variable data A001 and A002 cards, which describe those portions of a source's operation that relate solely to trace-material emissions. (It must be emphasized that cards 1 through 6 of the point source coding form are also to be completed for each emission source of trace materials.)

The variable data cards serve as storage for a large subsystem of data that provides approximately 26,000 cards for recording data for each point source. The first two cards in this subsystem, A001 and A002, have been allocated to trace-material and hazardous-pollutant data storage. A sample variable data coding form is shown in Figure 6-1.

6.2 INSTRUCTIONS FOR COMPLETING TRACE-MATERIALS CODING FORM

Procedures for completing cards 1 through 6 of the point source form have been specified in Chapter 4, Point Source Coding. This section discusses additional instructions for completing cards 1 through 6 if the source emits quantities of trace materials or hazardous pollutants.

In most situations, the source will emit quantities of particulates, SO_x, NO_x, hydrocarbons, and CO along with trace materials. In such cases, complete all six cards on the original coding form in addition to cards A001 and A002 for each point source. If a trace material is the only pollutant discharged, however, then it may be found that card 3 or card 5 of the point source form, or both cards, are not applicable, in which case all columns on the card(s) should be left blank. Enter zeros in spaces on card 4 relating to emission estimates of SO_x, NO_x, hydrocarbons, and CO if the source has negligible emissions of these compounds.



VARIABLE DATA INPUT FORM
WORKING COPY

TRACE MATERIALS HAZARDOUS POLLUTANT
INPUT FORM

DATE ____________

NAME OF PERSON
COMPLETING FORM ____________

ID		ID																				ID	
STATE	COUNTY	AQCR	PLANT ID NUMBER	POINT ID	YEAR OF RECORD	CITY	POLLUTANT	CONTROL EQUIPMENT PRIMARY SECONDARY	CONTROL EFF %	EMISSION ESTIMATE (TONS PER YEAR)	ESTIMATION METHOD	EMISSIONS INCLUDED ON CARD 4?	CHEMICAL FORM OF EMISSIONS	ALLOWABLE EMISSIONS (TONS PER YEAR)	COMPLIANCE STATUS	COMPLIANCE SCHEDULE MO YR	COMPLIANCE STATUS UPDATE DAY MO YR	REGULATION		ACTION	LC SEQ #	CD #	
1 2	3 4 5 6	7 8 9	10 11 12 13	14 15	16 17	18 19 20 21	22 23 24 25 26	27 28 29 30 31 32	33 34 35	36 37 38 39 40 41 42	43	44	45	46 47 48 49 50 51 52	53	54 55 56 57	58 59 60 61 62 63	64 65 66 67	68 69 70 71 72	73	74 75 76	77 78 79 80	

CARD COLUMN 77 MUST BE ALPHABETIC

Figure 6-1. Trace materials/hazardous pollutant source coding form.

Cards A001 and A002 refer to trace-material emissions from the emission point defined on card 2 of the point source coding form. Facility and emission point identification numbers on cards A001 and A002 must be identical to those on cards 2 through 6 on the original coding form. The format for the two cards A001 and A002 is as follows:

Card A001 - Emissions of Trace Materials or Hazardous Pollutants

Spaces	Format	Symbol	Description	Units
1-13	(Same identification codes used on original point source coding form)			-
14-15	XX	Numerical	Emission Point Identification Number	-
16-17	XX	Numerical	Year of Record	-
18-21	XXXX	Numerical Code	City Code	-
22-26	XXXXX	Numerical Code	Pollutant	-
27-29	XXX	Numerical Code	Primary Control Device	-
30-32	XXX	Numerical Code	Secondary Control Device	-
33-35	XX.X	Numerical	Collection Efficiency	%
36-42	XXXX.XXX	Numerical	Emission Estimate	T/yr
43	X	Numerical Code	Method of Estimating Emissions	-
44	X	Numerical Code	Emissions Included in Emission Estimates Card 4	-
45	X	Numerical Code	Chemical Form of Emissions	-
46-52	XXXX.XXX	Numerical	Allowable Emissions	T/yr
53	X	Numerical Code	Compliance Status	-
54-57	XXXX	Numerical Code	Compliance Schedule	yr, mo
58-63	XXXXXX	Numerical Code	Compliance Status Update	yr, mo, da
64-67	XXXX	Numerical Code	Regulation Code	-
73	X	Numerical	Update	-
74-76	XXX	Numerical	Sequence Number	-
77-80	A001	Alphabetic and Numeric	Card Identification Number	-

The detailed instructions that follow are to be used to complete card A001.

1. Emission Point Identification Number: The point source identification number must correspond to that on the original coding form.
2. Year of Record: The last two digits of the calendar year that the data on the card represent are entered here.
3. City Code: The city code must be identical with that of the original coding form.
4. Pollutant: This column specifies the contaminant to which all information on each card A001 refers. A five-digit code number is assigned to all compounds known to exist in the ambient atmosphere. The codes to be used in these columns, listed in Appendix A, Section 6, are presently limited to metallic pollutants and those declared to be hazardous pollutants. This code presents a family-tree subcategorization of pollutants, an arrangement that enables retrieval of data for a single pollutant or for an entire class of pollutants. Furthermore, these codes are compatible with the SAROAD system; thus, emissions can be correlated with ambient air pollutant loadings of individual trace pollutants.
5. Primary and Secondary Control Device: Only those coding numbers specified in the Control Equipment Identification Code (Appendix A, Section 3) should be used. A code number should be entered for any installed pollution control device that reduces the emission of the pollutant into the atmosphere. Enter a zero in the columns when it is known that there is no control device installed for reducing emissions of the pollutant. Leave spaces blank when control status is unknown.
6. Collection Efficiency: The overall collection efficiency of the pollutant for the entire process should be entered here. For example, assume that the pollutant load entering the control equipment is the normal, uncontrolled quantity for that process specified in card 6 of the point source coding form. The quantity of pollutant actually discharged into the atmosphere is the outlet loading. Estimate collection efficiency with these two values. Enter a zero in the column if there is no effective removal efficiency; leave the column blank if efficiency is unknown.
7. Emission Estimate: The annual, controlled emissions of the pollutant in tons per year should be entered here. Note that the positioning of the decimal point allows emission quantities to be reported to the nearest 2 pounds of emission per year.

8. Method of Estimating Emissions: The following codes should be used to specify the manner in which the emissions reported in columns 36 through 42 were determined.

Code	Description of Method
0	Not applicable (if emissions of the pollutant are negligible)
1	Stack test results or other emission measurements
2	Material balance using engineering knowledge and process expertise
3	Emissions calculated by means of emission factors
4	Guess

9. Emissions Included in Estimates on Card 4: Emissions of the trace material specified in card A001 may already have been included in card 4 of the original coding form. For example, lead emissions might have been included in estimates of particulate losses in columns 31 through 37 of card 4. This column denotes whether or not the quantity of trace material discharged from the source was included on card 4. Use the following codings or leave blank if unknown.

Code	Description
1	All emissions of trace material were included in estimates reported on card 4.
2	About one-half of the trace-material emission was probably reported on card 4.
3	None of the trace-material emission was reported in the estimate reported on card 4.

10. Chemical Form of Emissions: Trace materials can be emitted as particulates, gases, or a combination of both. This column is used to estimate the chemical state of the emissions. Use the following codes and leave blank if unknown.

Code	Description
1	Emissions are primarily large settleable particulates
2	Emissions are primarily small suspended particulates
3	Emissions are primarily in the gaseous form
4	Emissions are probably a combination of particulates and gases

11. Allowable Emissions and Compliance Status: The legal requirements placed upon the source for reducing emissions of the trace material are specified in columns 46 through 63. Follow the same procedure and use the same codes as described for card 5 of the original coding form. Note that allowable emissions can be reported to the nearest 2 pounds per year.

12. Regulation Code: The instructions and coding lists for making these entries are found in Appendix A, Section 5.

13. Update, Sequence Number, and Card Identification Number: These entries are as specified on the variable data form (Figure 6-1).

Card A002 - Comments on Trace Materials or Hazardous Pollutants

Spaces	Format	Symbol	Description	Units
1-21	(Same identification as card A001)			-
22-72	Comments, alphabetic or numeric	-	-	-
73	X	Numerical	Update	-
74-76	XXX	Numerical	Sequence Number	-
77-80	A002	Alphabetic and Numeric	Card Identification Number	-

Because it is expected that there will be many unusual situations relating to the emission of trace materials at a source, columns 22 through 72 in card A002 are allowed for describing these factors. Information on this card will update knowledge of trace material emissions. This knowledge, in turn, will be used to improve the Emission Factor File and the Source Classification Code File.

7. DATA PRESENTATION

7.1 INTRODUCTION

The emission inventory system described in previous chapters has been especially designed to facilitate grouping the point and area source data in multiple arrangements. The three groupings listed below are basic "sorting" or indexing arrangements for an emission inventory:

1. Emissions according to source category (i.e., by SCC or SIC code).
2. Emissions according to pollutant (e.g., mercury emissions).
3. Emissions within a specific geographical area.

Any of these groupings can be used to display the emission data in a multitude of ways suitable for a variety of uses. For example, emissions of hydrocarbons may be automatically listed for a region, state, or county in order of relative contributions from each point source.

Another combination of groupings could involve the tabulation of emissions of all pollutants from pulp mills or chloroalkali plants in a region, state, or county. As the coding forms described in Chapters 4 and 5 are expanded by users to collect additional data for specialized uses, standard formats will be developed to summarize the data. For example, if an annual operating permit is required for each point source, then the agency may need a list revealing those permits about to expire.

Summaries and tabulations of emissions data may include:

1. Emission tabulation by source category, county, state, and region.
2. Stationary and mobile fuel balances within an area.
3. Solid waste balances.
4. Contribution of specific sources to emission totals.
5. Point source versus area source contribution.
6. Emission density maps for stationary and mobile source emissions arranged by pollutant.
7. Installed pollution control equipment.
8. Indexes of process sources emitting specific pollutants.
9. Time fluctuations of emissions.

10. Legal status of each source category to comply with air pollution control requirements.

The inventory system described in this manual is primarily intended to accumulate data on pollutant emissions; however, the corresponding process data for each source include extractable information on addresses, number of control devices, and other plant factors. For example, names and addresses of all organizations emitting asbestos (or any other pollutant) may be needed for a mailing list. In such a case the following procedure would be used:

1. Select the appropriate SCC.
2. Instruct the computer to tabulate all sources with the given SCC inside the study area.
3. Instruct the system to print out columns 22 through 63 of card 1 of the point source coding form (names and addresses) for all sources.

The inventory system is designed to determine annual emissions of pollutants; however, as the data base becomes more complete and emission factors become more accurate, the need will arise to determine variance of emission rates with time. This determination can easily be made by basing the automatic calculations of emissions on production rate data (columns 18 through 30 of card 4 of the point source coding form), thus allowing estimates of daily, weekly, and seasonal variations in emission rates to be made.

Computer programs are now being written to retrieve the inventory data according to the format described in Appendices D and E of the Federal Register dated August 14, 1971. This format summarizes county emissions by area/point sources and according to specific groupings of source categories. When completed, such summaries will be routinely produced by OAP, EPA for county, state, or regional areas. Moreover, as requests for other summaries become more frequent, additional programs will be developed by OAP.

It must be emphasized that the main advantages of a large, computerized data base are:

1. The availability of relatively small quantities of detailed information contained in the large data base (e.g., all data available on one or two power plants).
2. The ability to obtain short summaries from the large data base.

The first advantage has been partially discussed in previous paragraphs and is probably most valuable in those agency decisions that require detailed technical information; however, decisions on pollution control strategies are made on many governmental levels, each of which requires data in varying degrees of detail. Decisions at higher levels of management may require only a brief emission summary from the control agency. Unfortunately, acquiring these numbers may be time-consuming without computer access and a well-arranged data system. The inventory system described in this manual has sufficient flexibility and capability to substantially reduce manpower expenditures in answering questions such as, "What are the particulate emissions in this Congressional District and where do they come from?" Such requests can often be easily interpreted by a pictorial presentation of emissions data. For example, "pie" charts comparing the contributions of source categories to total emissions might be more easily understood by the general public than numerical tables.

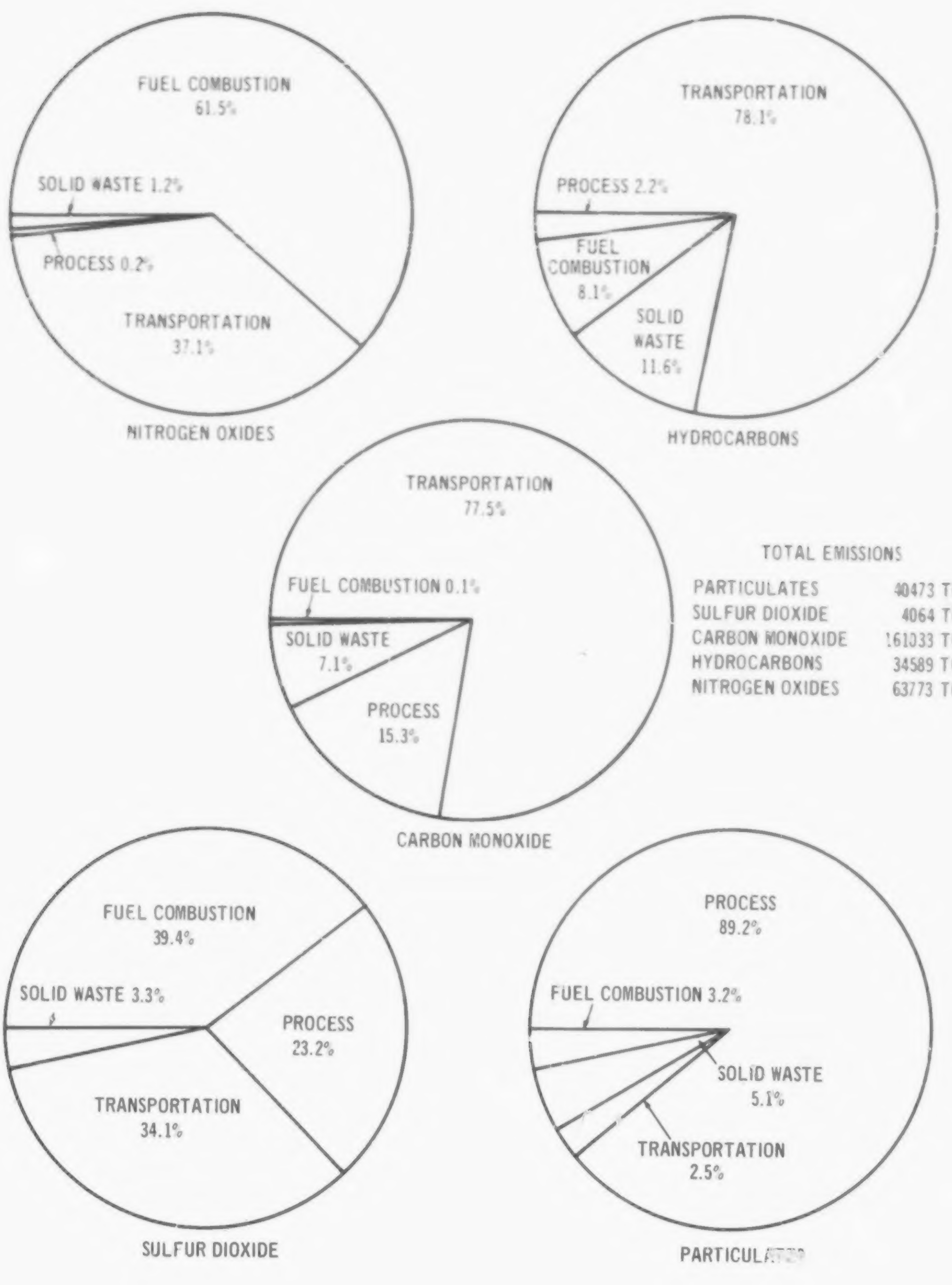
Figure 7-1 demonstrates the use of the pie chart to display concisely a large amount of information that would occupy several pages of tables in a report. Pie charts are easily constructed and can simplify comparison of data on various emissions and their sources. Because the charts compare emissions on a relative basis in percentages and fractions of total emissions, the total emissions should also be listed. With the totals and percentages, calculations of quantities of emissions are easily made. Furthermore, visual comparison of the relative quantities of emissions is possible if the total area of each chart corresponds to the quantity of each pollutant. A series of charts would then contain "pies" of different sizes according to the varying quantities of emission.

Emission density maps offer one of the best methods of revealing (1) source contributions by geographical area, and (2) concentrations of emitted pollutants by geographical area. Because the inventory techniques described in this manual allow emissions to be collected on a countywide basis, pollutant density maps can be constructed automatically with a computer plotter. Moreover, techniques for apportioning the countywide data to smaller areas, thus showing more clearly the emission density profile of each county, have been developed and are based on "gridding." The county emissions apportioned to each grid are then used to construct an emission density map for the county.

A map of the study area is divided into a grid pattern using the UTM coordinate system as shown in Figure 7-2. This grid is used as the basic unit of area in summarizing the emissions of each pollutant from all sources. The rest of this chapter explains the procedure for apportioning county emission data to grids.

7.2 APPORTIONING POPULATION DATA TO GRIDS

Information on population and housing distribution in counties by census tracts is available for 1970 from the U. S. Bureau of the Census. The following documents provide the most useful data:



TOTAL EMISSIONS

PARTICULATES	40473 TONS
SULFUR DIOXIDE	4064 TONS
CARBON MONOXIDE	161033 TONS
HYDROCARBONS	34589 TONS
NITROGEN OXIDES	63773 TONS

Figure 7-1. Use of pie charts to illustrate relative distribution of pollutant emissions from various sources.

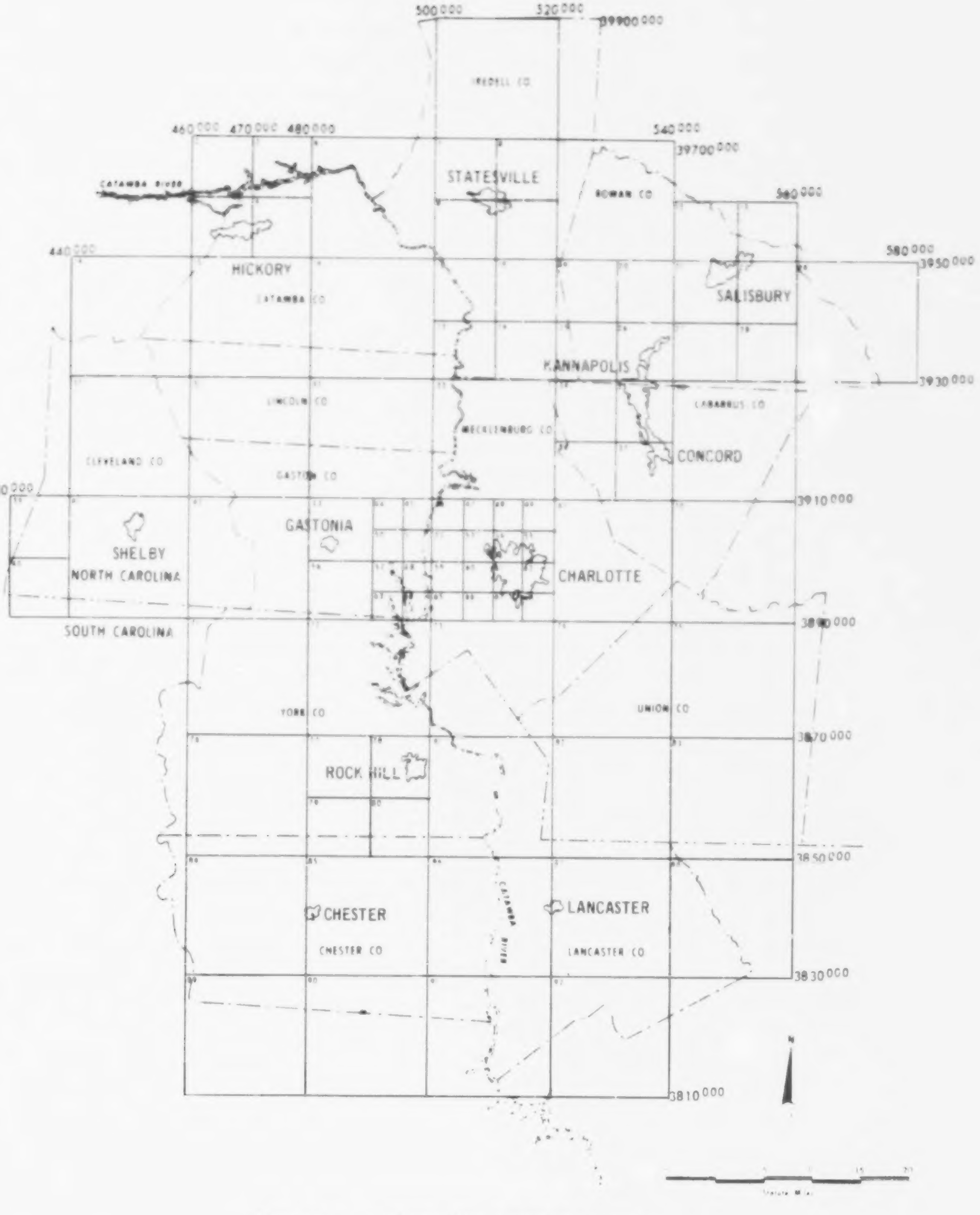

500 000
520 000
3990 000
IREDELL CO
460 000
470 000
480 000
540 000
3970 000
CATAWBA RIVER
STATESVILLE
ROWAN CO
560 000
440 000
HICKORY
CATAWBA CO
580 000
3950 000
SALISBURY
KANNAPOLIS
3930 000
LINCOLN CO
CABARRUS CO
MECKLENBURG CO
CLEVELAND CO
CONCORD
GASTON CO
430 000
3910 000
GASTONIA
SHELBY
NORTH CAROLINA
CHARLOTTE
SOUTH CAROLINA
3890 000
YORK CO
UNION CO
3870 000
ROCK HILL
3850 000
CHESTER
LANCASTER
CATAWBA RIVER
CHESTER CO
LANCASTER CO
3830 000
3810 000
N
Statute Miles

Figure 7-2. Grid coordinate system example.

General Characteristics for States, Cities, and Counties.[1]

Contains statistics on number of units at each address, number of rooms, kitchen facilities, commercial establishment on property, and vacancy status for all places surveyed; data are broken down by states, counties, SMSA's, urbanized areas, and places with 1,000 inhabitants or more.

Detailed Characteristics for States, Cities, and Counties.[2]

Contains selected data on number of units at each address, number of rooms, heating equipment, fuel heating, cooking and water heating, appliances, automobiles, and data available for all or some of the following areas: states, counties, SMSA's, urbanized areas, and places with 2,500 inhabitants or more.

Census Tract Reports.[3]

Contains one report for each SMSA, showing data for most of the population and housing subjects included in the 1970 census. Some tables are based on 100 percent tabulation, others on sample tabulation.

Number of Inhabitants.[4]

Contains final official population counts for states, counties (by urban-rural residence), SMSA's, urbanized areas, minor civil divisions, county divisions, all incorporated places, and unincorporated places with 1,000 inhabitants or more.

Before obtaining any of the above documents, it is suggested that the nearest U. S. Department of Commerce field office listed below be contacted first to determine what written information is currently available for the study area. If highly detailed information is sought, the field office can offer assistance in obtaining the information from computer tape, if available. A more complete breakdown of population and housing data might be available from local planning agencies or the Chamber of Commerce.

U. S. DEPARTMENT OF COMMERCE FIELD OFFICES

Albuquerque, N. Mex. 87101, U. S. Courthouse
Anchorage, Alaska 99501, 412 Hill Building
Atlanta, Ga. 30303, 75 Forsyth St., N. W.

Baltimore, Md. 21202, U. S. Customhouse
Birmingham, Ala. 35205, 907 Sough 20th St.
Boston, Mass. 02203, John F. Kennedy Fed. Bldg.
Buffalo, N. Y. 14203, 117 Ellicott St.

Charleston, S. C. 29403, 334 Meeting St.
Charleston, W. Va. 25301, 500 Quarrier St.
Cheyenne, Wyo. 82001, 2120 Capitol Ave.

Chicago, Ill. 60604, 219 South Dearborn St.
Cincinnati, Ohio 45202, 550 Main St.
Cleveland, Ohio 44114, 666 Euclid Ave.

Dallas, Tex. 75202, 1114 Commerce St.
Denver, Colo. 80202, Room 161, New Customhouse
Des Moines, Iowa 50309, 210 Walnut St.
Detroit, Mich. 48226, Federal Bldg.

Greensboro, N. C. 27402, Federal Bldg.

Hartford, Conn. 06103, 450 Main St.
Honolulu, Hawaii 96813, 1015 Bishop St.
Houston, Tex. 77002, 515 Rusk Ave.

Jacksonville, Fla. 32202, 400 West Bay St.

Kansas City, Mo. 64106, 601 East 12th St.

Los Angeles, Calif. 90024, 11000 Wilshire Blvd.

Memphis, Tenn. 38103, 147 Jefferson Ave.
Miami, Fla. 33130, 25 West Flagler St.
Milwaukee, Wis. 53203, 238 West Wisconsin Ave.
Minneapolis, Minn. 55401, 110 South Fourth St.

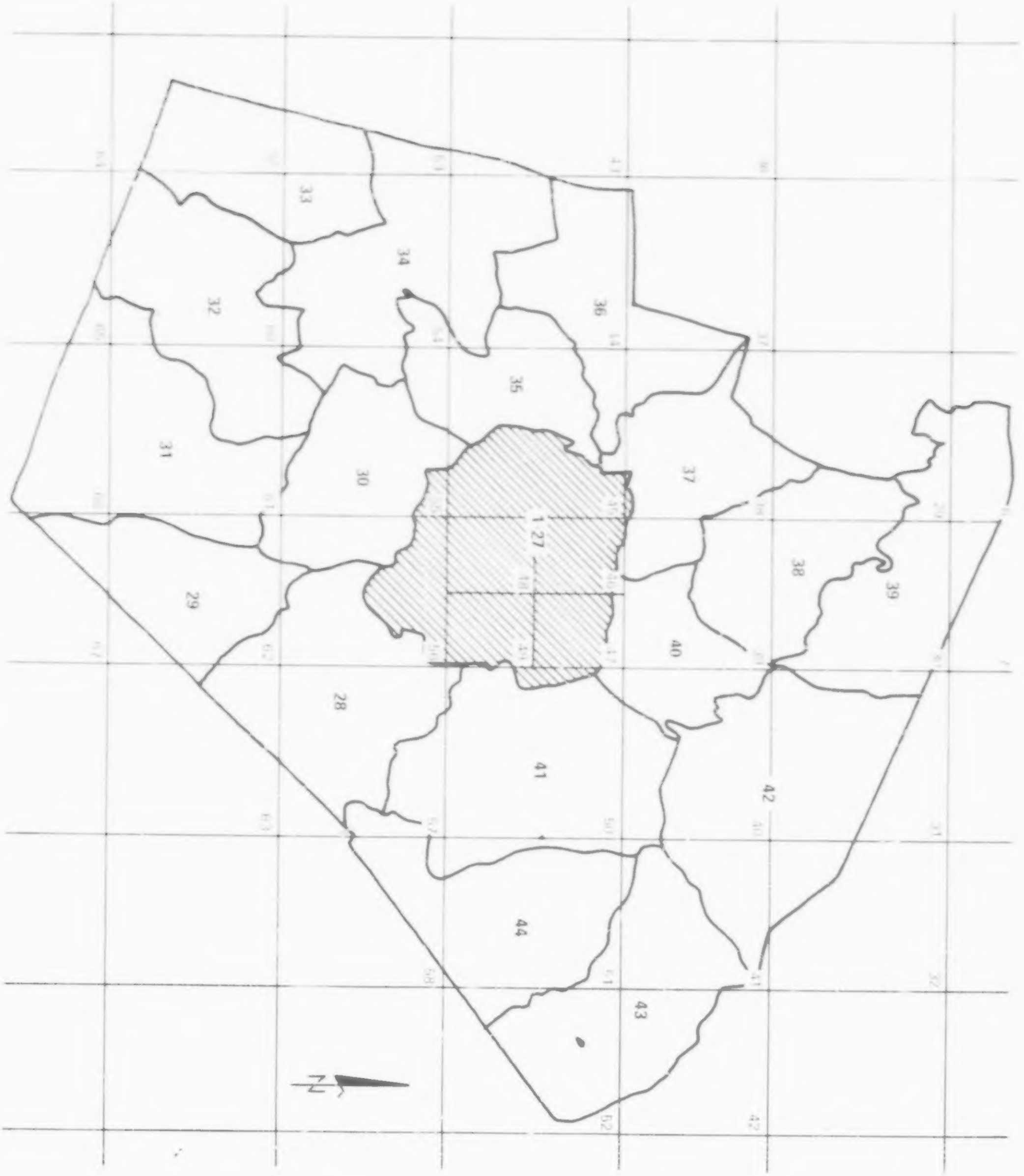
New Orleans, La. 70130, 610 South St.
New York, N. Y. 10007, 26 Federal Plaza, Foley Sq.

Philadelphia, Pa. 19107, 1015 Chestnut St.
Phoenix, Ariz. 85025, 230 North First Ave.
Pittsburgh, Pa. 15222, 1000 Liberty Ave.
Portland, Oreg. 97204, 520 S. W. Morrison St.

Reno, Nev. 89502, 300 Booth St.
Richmond, Va. 23240, 400 North 8th St.

St. Louis, Mo. 63103, 1520 Market St.
Salt Lake City, Utah 84111, 125 South State St.
San Francisco, Calif. 94102, 450 Golden Gate Ave.
San Juan, P. R. 00902, Post Office Bldg.
Savannah, Ga. 31402, 125-29 Bull St.
Seattle, Washington 98104, 909 First Ave.

Once the census tract map has been obtained, an overlay for the grid system, as shown for one county in Figure 7-3 can be used. Data for the more densely populated shaded portion would be given on a similar map showing only the tracts in the shaded portion. Assuming that the population and housing are distributed uniformly over each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N

Figure 7-3. UTM grid overlay of census tract map of one county.

census tract, it is now possible to estimate the population density for each grid zone. Populations for each grid zone are computed by estimating the fraction of a census tract in a grid zone, multiplying this fraction by the total population of the census tract, and summing the contributions of each census tract within the grid zone. This procedure is now being computerized by OAP, EPA. The computer program divides each fraction of a census tract into appropriate grids before multiplying the fractions by the total population of the census tract. This procedure ensures that all the population in the census tract is apportioned onto the grids. After apportioning, the populations in all grids in the study area are checked to ensure that the sum is identical to the total population of all census tracts in the study area.

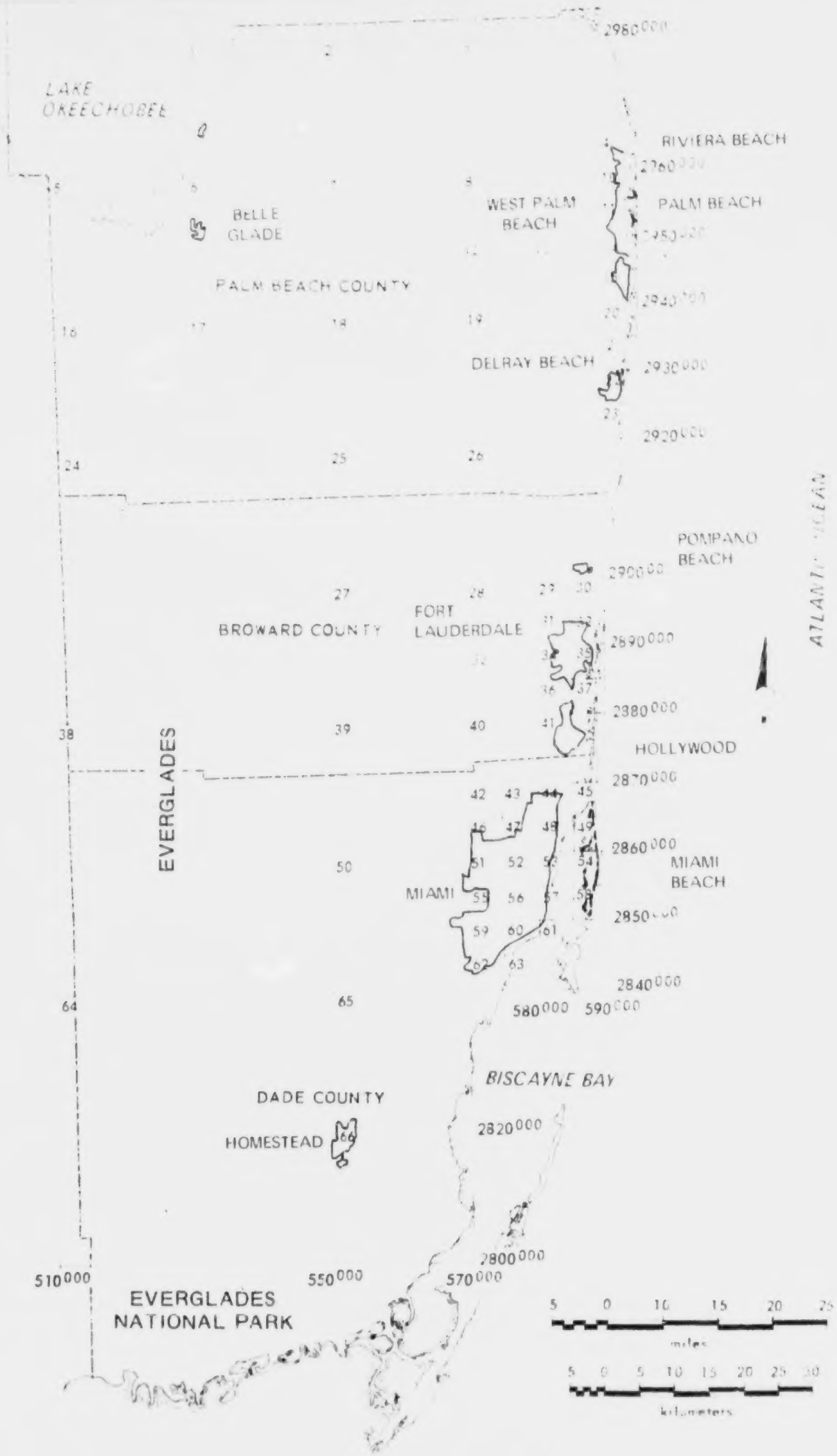
Figure 7-4 shows the grid system selected for a three-county example study area. Using the procedure described above, the population density map of Figure 7-5 has been constructed for this area by dividing the population of each grid zone by the area of that grid zone. Data for housing and types of space heating are distributed in the same way as those for population.

7.3 APPORTIONING TRANSPORTATION EMISSIONS TO GRIDS

To properly assess the impact of emissions of transportation sources, the emissions must be apportioned onto the grids. Apportioning is done on the basis of vehicle miles traveled in each grid for motor vehicles, miles of railroad track in each grid for railroads, and ship traffic data for vessels. Aircraft, considered as area sources, are applied to the grids at airport locations.

7.3.1 Apportioning Vehicle Miles Traveled and Vehicle Emissions to Grids

If possible, comprehensive traffic-count maps from local and state highway departments and metropolitan planning agencies should be obtained. These maps should, as least, show traffic counts (in units of vehicles per day) for all expressways, major arterial roads of major cities, and downtown streets of major cities to ensure that a substantial portion of the commuting traffic and through traffic can be accurately proportioned. The grid zones are delineated on these maps in the same manner as was done for census tract maps. The number of vehicle miles traveled on a road in a grid zone is obtained by measuring the miles of road between two consecutive traffic counts and multiplying this distance by the numerical average of the two counts. When measuring the vehicle miles, special note should be taken of the number of vehicle miles traveled per grid on roads where diesel-powered vehicles would most likely travel: expressway, arterial, and downtown roads. These totals will be required later in the methodology.


LAKE OKEECHOBEE
RIVIERA BEACH
WEST PALM BEACH
PALM BEACH
BELLE GLADE
PALM BEACH COUNTY
DELRAY BEACH
POMPANO BEACH
ATLANTIC OCEAN
BROWARD COUNTY
FORT LAUDERDALE
HOLLYWOOD
EVERGLADES
MIAMI
MIAMI BEACH
BISCAYNE BAY
DADE COUNTY
HOMESTEAD
EVERGLADES NATIONAL PARK
2980000
2960000
2950000
2940000
2930000
2920000
2900000
2890000
2880000
2870000
2860000
2850000
2840000
2820000
2800000
510000
550000
570000
580000
590000
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26
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28
38
39
40
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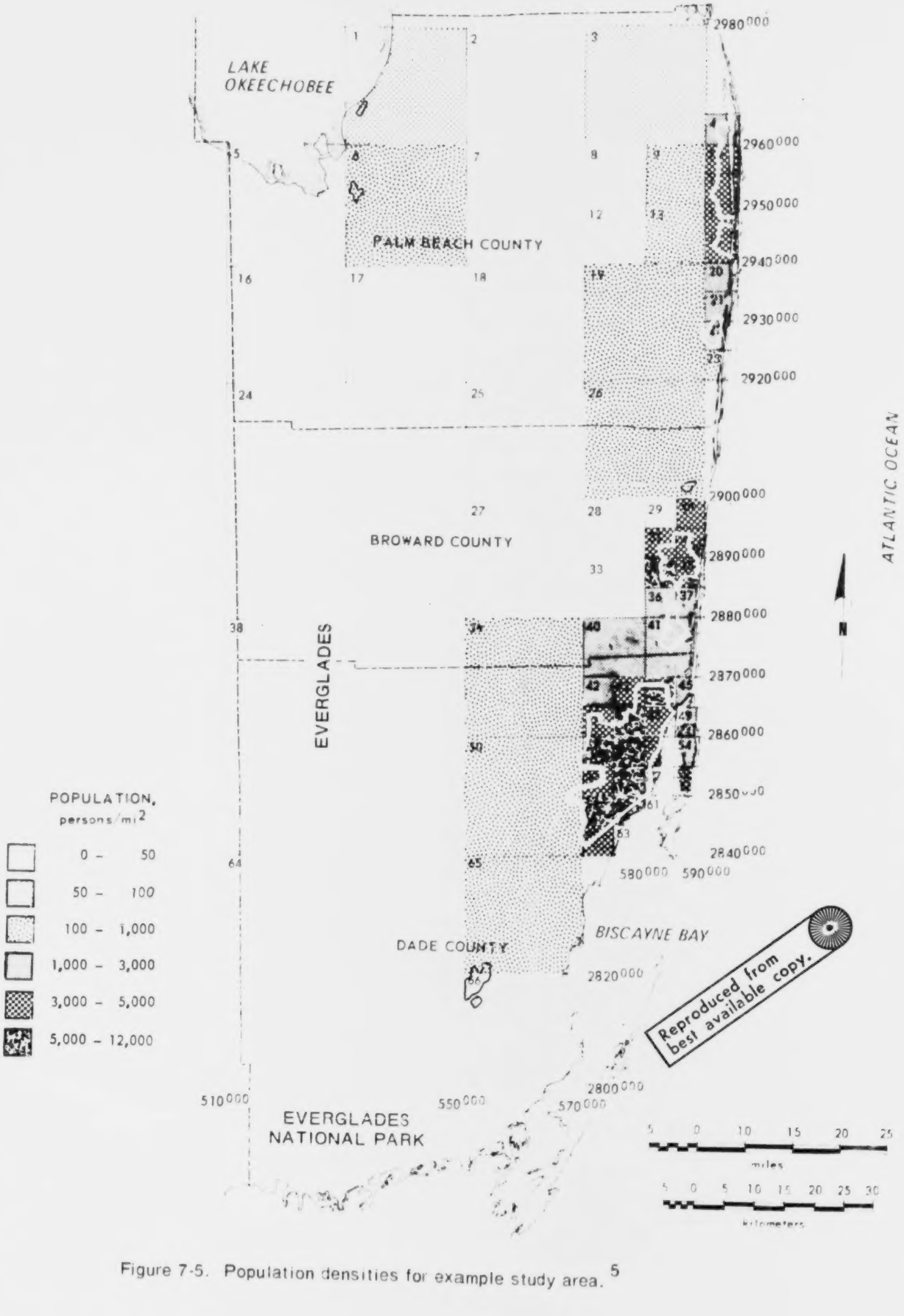
43
50
51
52
56
59
60
61
62
63
64
65
66
5 0 10 15 20 25
miles
5 0 5 10 15 20 25 30
kilometers

Figure 7-4. Grid coordinate system for example study area.[5]


LAKE OKEECHOBEE
PALM BEACH COUNTY
BROWARD COUNTY
DADE COUNTY
EVERGLADES
EVERGLADES NATIONAL PARK
BISCAYNE BAY
ATLANTIC OCEAN
N
2980000
2960000
2950000
2940000
2930000
2920000
2900000
2890000
2880000
2870000
2860000
2850000
2840000
2820000
2800000
510000
550000
570000
580000
590000
5 0 10 15 20 25
miles
5 0 5 10 15 20 25 30
kilometers
POPULATION, persons/mi²
☐ 0 – 50
☐ 50 – 100
▨ 100 – 1,000
☐ 1,000 – 3,000
▩ 3,000 – 5,000
■ 5,000 – 12,000

Reproduced from best available copy.

Figure 7-5. Population densities for example study area.[5]

It is very unlikely that the traffic-count maps that are used to measure vehicle miles will be of the same year as the intended emission inventory; these maps will, therefore, require updating. This updating should reflect the total increase in gasoline-powered and diesel-powered motor vehicle activity in the study area since the traffic-count map was made. Diesel vehicle miles and gasoline vehicle miles should be updated separately by means of the fuel consumption totals for each.

Before the traffic-count totals can be updated or the diesel-powered vehicle miles proportioned, the number of diesel-powered vehicle miles included in the total vehicle miles on the traffic-count maps must be determined. The diesel-powered vehicle miles can be estimated by multiplying the percent of the total vehicle miles in the study area that are deisel-powered by the vehicle miles of each grid that were measured from roads having diesel traffic. The diesel percentages should also take the year of the traffic survey into consideration. Remaining diesel-powered vehicle miles should then be apportioned to grid zones on the basis of those diesel-powered vehicle miles already distributed by the traffic-count maps.

The last step before calculating emissions is to distribute the gasoline-powered vehicle miles that remain after the traffic-count maps have been used. These undistributed vehicle miles may be apportioned on the basis of population because most remaining motor vehicle activity would occur in residential areas.

In many cases vehicle counts will be unavailable. In such a situation, the grid zones must be laid out on a road map of the study area. The total miles of road in each grid zone are calculated on the basis of the following street classes: major, industrial, commercial, residential, and other; the average vehicle counts as given in Table 7-1 can then be applied in determining the vehicle miles for the grid zone.

Table 7-1. AVERAGE VEHICLE COUNTS BY LAND USE [6]
(vehicles/day)

Street class	Density
Major	17,000
Industrial	14,000
Commercial	10,000
Residential	1,000
Other	1,000

After the vehicle miles have been established for each zone, it will be necessary to estimate the emissions for the zones based on the vehicle miles. The following factors must be taken into account in computing the emissions: sources of pollutants within the vehicle, degree of emissions control, and average speed for each type of road in the zone.

Pollutants emanate from the exhaust system, engine crankcase blowby, carburetor, and fuel tank in an uncontrolled gasoline-powered vehicle. The exhaust system emissions consist of all the products of fuel combustion; the crankcase emissions are hydrocarbons that escape from the engine cylinders. The emissions from the carburetor and fuel tank are evaporative hydrocarbons. Before the proper emission factors can be applied, an average speed for each type of road must be assumed. These average speeds are often available from local traffic information; if not, the average speeds shown in Table 7-2 can be used.

Table 7-2. AVERAGE VEHICLE SPEEDS BY ROUTE CLASS[7]
(mi/hr)

Route class	Average speed
Urban streets	25
Suburban roads	35
Rural roads	45
Limited-access expressway	50 and greater

For each grid an estimate should be made of total vehicle miles traveled by diesel vehicles. An estimate of these miles can be made from local traffic data and subtracted from the total vehicle miles for a given grid. If such data are not available, 2 percent of the total vehicle miles for an area may be considered to be traveled by diesel vehicles. When estimating diesel vehicle miles, one should be careful not to estimate diesel miles in residential areas and on roads that are restricted to automobiles, such as roads that specify "no through trucks."

The following example illustrates how emissions from motor vehicles in one grid zone are calculated.

Example 7-1. Calculation of Motor Vehicle Emissions for a Grid Zone.

Given:

I. By planimeter measurement, the grid zone has:
    2 miles of residential roads
    1 mile of arterial roads
    1 mile of business roads

II. Vehicle counts for the roads in the grid zones are broken down in the following ways:
    Residential routes = 1,000 vehicles/day
    Arterial routes = 10,000 vehicles/day
    Business routes = 20,000 vehicles/day

III. Because no data are available on the percentage of vehicles that are diesel, it will be assumed that 2.5 percent of the vehicles on business routes are diesel-powered, and that residential and arterial routes have no diesel traffic.

IV. Emission factors[8] are given in grams per vehicle mile for gasoline-powered vehicles and in pounds per 1000 gallons of diesel fuel for diesel-powered vehicles. It will be assumed that diesel-powered vehicles get 5.1 miles per gallon of diesel fuel.

Calculations:

I. Vehicle Miles Traveled (VMT):

$$\text{Residential VMT} = (1{,}000\ \frac{\text{vehicles}}{\text{day}})\ (2\ \text{miles}) = 2{,}000\ \frac{\text{VMT}}{\text{day}}$$

$$\text{Arterial VMT} = (10{,}000\ \frac{\text{vehicles}}{\text{day}})\ (1\ \text{mile}) = 10{,}000\ \frac{\text{VMT}}{\text{day}}$$

$$\text{Business VMT} = (20{,}000\ \frac{\text{vehicles}}{\text{day}})\ (1\ \text{mile}) = 20{,}000\ \frac{\text{VMT}}{\text{day}}$$

$$\text{Gasoline VMT} = (20{,}000\ \frac{\text{VMT}}{\text{day}})\ (0.975) = 19{,}500\ \frac{\text{gasoline VMT}}{\text{day}}$$

$$\text{Diesel VMT} = (20{,}000\ \frac{\text{VMT}}{\text{day}})\ (0.025) = 500\ \frac{\text{diesel VMT}}{\text{day}}$$

II. Gallons of diesel fuel:

$$\frac{(500\ \frac{\text{diesel VMT}}{\text{day}})}{(5.1\ \frac{\text{miles}}{\text{gal diesel fuel}})} = 100\ \text{gal diesel fuel/day}$$

III. Emissions:

A. SO_2

$$\text{Residential} = (2000\ \frac{\text{VMT}}{\text{day}})\ (0.18\ \text{gal/VMT})\ (\frac{1\ \text{lb}}{454\ \text{gal}}) = 0.8\ \frac{\text{lb}}{\text{day}}$$

$$\text{Arterial} = (10{,}000\ \frac{\text{VMT}}{\text{day}})\ (0.18\ \text{gal/VMT})\ (\frac{1\ \text{lb}}{454\ \text{gal}}) = 4.0\ \frac{\text{lb}}{\text{day}}$$

$$\text{Business} = (19{,}500\ \frac{\text{VMT}}{\text{day}})\ (0.18\ \text{gal/VMT})\ (\frac{1\ \text{lb}}{454\ \text{gal}}) = 7.7\ \frac{\text{lb}}{\text{day}}$$

$$\text{Diesel} = (\frac{100\ \text{gal diesel fuel}}{\text{day}})\ (\frac{45\ \text{lb}}{1000\ \text{gal diesel fuel}}) = 4.5\ \frac{\text{lb}}{\text{day}}$$

$$\text{Total } SO_2 = 17\ \frac{\text{lb}}{\text{day}}$$

B. Particulate

$$\text{Residential} = (10{,}000\ \frac{\text{VMT}}{\text{day}})\ (0.30\ \text{gal/VMT})\ (\frac{1\ \text{lb}}{454\ \text{gal}}) = 1.3\ \frac{\text{lb}}{\text{day}}$$

$$\text{Arterial} = (10{,}000\ \frac{\text{VMT}}{\text{day}})\ (0.30\ \text{gal/VMT})\ (\frac{1\ \text{lb}}{454\ \text{gal}}) = 6.6\ \frac{\text{lb}}{\text{day}}$$

$$\text{Business} = (19{,}500\ \frac{\text{VMT}}{\text{day}})\ (0.30\ \text{gal/VMT})\ (\frac{1\ \text{lb}}{454\ \text{gal}}) = 12.9\ \frac{\text{lb}}{\text{day}}$$

$$\text{Diesel} = (\frac{100\ \text{gal diesel fuel}}{\text{day}})\ (\frac{13\ \text{lb}}{1000\ \text{gal diesel fuel}}) = 1.3\ \frac{\text{lb}}{\text{day}}$$

$$\text{Total Particulates} = 22.1\ \frac{\text{lb}}{\text{day}}$$

C. NO_x

$$\text{Residential} = (2{,}000\ \frac{\text{VMT}}{\text{day}})\ (9\ \text{gal/VMT})\ (\frac{1\ \text{lb}}{454\ \text{gal}}) = 40\ \frac{\text{lb}}{\text{day}}$$

$$\text{Arterial} = (10{,}000\ \frac{\text{VMT}}{\text{day}})\ (9\ \text{gal/VMT})\ (\frac{1\ \text{lb}}{454\ \text{gal}}) = 198\ \frac{\text{lb}}{\text{day}}$$

$$\text{Business} = (19{,}500\ \frac{\text{VMT}}{\text{day}})\ (9\ \text{gal/VMT})\ (\frac{1\ \text{lb}}{454\ \text{gal}}) = 387\ \frac{\text{lb}}{\text{day}}$$

$$\text{Diesel} = (\frac{100\ \text{gal diesel fuel}}{\text{day}})\ (\frac{370\ \text{lb}}{1000\ \text{gal diesel fuel}}) = 37\ \frac{\text{lb}}{\text{day}}$$

$$\text{Total } NO_x = 662\ \frac{\text{lb}}{\text{day}}$$

D. CO

$$\text{Residential} = (2000\ \frac{\text{VMT}}{\text{day}})\ (95\ \text{gal/VMT})\ (\frac{1\ \text{lb}}{454\ \text{gal}})\ (1.2)^* = 502\ \frac{\text{lb}}{\text{day}}$$

$$\text{Arterial} = (10{,}000\ \frac{\text{VMT}}{\text{day}})\ (95\ \text{gal/VMT})\ (\frac{1\ \text{lb}}{454\ \text{gal}})\ (1.0)^* = 2092\ \frac{\text{lb}}{\text{day}}$$

$$\text{Business} = (19{,}500\ \frac{\text{VMT}}{\text{day}})\ (95\ \text{gal/VMT})\ (\frac{1\ \text{lb}}{454\ \text{gal}})\ (2.1)^* = 8570\ \frac{\text{lb}}{\text{day}}$$

$$\text{Diesel} = (\frac{100\ \text{gal diesel fuel}}{\text{day}})\ (\frac{225\ \text{lb}}{1000\ \text{gal diesel fuel}}) = 22\ \frac{\text{lb}}{\text{day}}$$

$$\text{Total CO} = 11{,}186\ \frac{\text{lb}}{\text{day}}$$

E. HC

Residential

$$\text{Exhaust} = (2000\ \frac{\text{VMT}}{\text{day}})\ (12\ \text{gal/VMT})\ (\frac{1\ \text{lb}}{454\ \text{gal}})\ (1.15)^* = 61\ \frac{\text{lb}}{\text{day}}$$

$$\text{Crankcase} = (2000\ \frac{\text{VMT}}{\text{day}})\ (0.9\ \text{gal/VMT})\ (\frac{1\ \text{lb}}{454\ \text{gal}}) = 4\ \frac{\text{lb}}{\text{day}}$$

$$\text{Evaporative} = (2000\ \frac{\text{VMT}}{\text{day}})(2.7\ \text{gal/VMT})\ (\frac{1\ \text{lb}}{454\ \text{gal}}) = 12\ \frac{\text{lb}}{\text{day}}$$

$$\text{Total Residential HC} = 77\ \frac{\text{lb}}{\text{day}}$$

Arterial

$$\text{Exhaust} = (10{,}000\ \frac{\text{VMT}}{\text{day}})\ (12\ \text{gal/VMT})\ (\frac{1\ \text{lb}}{454\ \text{gal}})\ (1.0)^* = 264\ \frac{\text{lb}}{\text{day}}$$

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* Average vehicle speed adjustment factor. Adjustments of the emission factors for CO and HC are necessary because the emissions of these pollutants vary considerably with vehicle speed.[8]

$$\text{Crankcase} = (10{,}000\ \frac{\text{VMT}}{\text{day}})\ (0.9\ \text{gal/VMT})\ (\frac{1\ \text{lb}}{454\ \text{gal}}) = 20\ \frac{\text{lb}}{\text{day}}$$

$$\text{Evaporative} = (10{,}000\ \frac{\text{VMT}}{\text{day}})\ (2.7\ \text{gal/VMT})\ (\frac{1\ \text{lb}}{454\ \text{gal}}) = 60\ \frac{\text{lb}}{\text{day}}$$

$$\text{Total Arterial HC} = 344\ \frac{\text{lb}}{\text{day}}$$

Business

$$\text{Exhaust} = (19{,}500\ \frac{\text{VMT}}{\text{day}})\ (12\ \text{gal/VMT})\ (\frac{1\ \text{lb}}{454\ \text{gal}})\ (1.75)^* = 902\ \frac{\text{lb}}{\text{day}}$$

$$\text{Crankcase} = (19{,}500\ \frac{\text{VMT}}{\text{day}})\ (0.9\ \text{gal/VMT})\ (\frac{1\ \text{lb}}{454\ \text{gal}}) = 39\ \frac{\text{lb}}{\text{day}}$$

$$\text{Evaporative} = (19{,}500\ \frac{\text{VMT}}{\text{day}})\ (2.7\ \text{gal/VMT})\ (\frac{1\ \text{lb}}{454\ \text{gal}}) = 116\ \frac{\text{lb}}{\text{day}}$$

$$\text{Total Business HC} = 1{,}057\ \frac{\text{lb}}{\text{day}}$$

Diesel

$$(100\ \text{gal diesel fuel})\ (\frac{37\ \text{lb}}{1000\ \text{gal diesel fuel}}) = 3.7\ \frac{\text{lb}}{\text{day}}$$

$$\text{Total HC} = 1{,}482\ \frac{\text{lb}}{\text{day}}$$

Whenever a large number of grid zones are involved, the above procedure should be computerized. Calculation of the vehicle miles by category in each grid remains a manual operation. The estimation of vehicle emissions based on vehicle miles traveled is very time-consuming. Data are often not available, and available data are often out of date. The calculation of emissions of those pollutants that are not affected by speed is not easy. Despite the above disadvantages, the method based on vehicle miles is the best available at present.

7.3.2 Apportioning Railroad Track and Railroad Emissions to Grids

Railroad emissions in most areas do not contribute significantly to the total emissions from mobile sources. The procedure outlined here is very general and easily carried out. If more detailed information is desired for grids containing extensive track facilities, such data can often be obtained locally by contacting the stationmaster or other railroad officials. They may be able to provide such information as the number of trains per day, number of switch engines in the yard, hourly fuel consumption rates, and number of operating days per year. In most cases the procedure outlined below is sufficient to distribute railroad emissions among the grids.

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* Average vehicle speed adjustment factor. Adjustments of the emission factors for CO and HC are necessary because the emissions of these pollutants vary considerably with vehicle speed.[8]

If possible, fuel consumption data should be obtained from individual railroad companies that operate in the study area. In some cases, the consumption may be broken down by stations within the study area. If this is not possible, information on annual consumption of railroad diesel fuel by states is available from the Bureau of Mines.[9] The state fuel total is distrubuted into counties, based on miles of track per county. Using listed emission factors,[8] the emissions from railroad fuel use may be estimated for each county.

In order to distribute the county emissions onto a grid system, the miles of railroad tracks in each grid may be measured from USGS topographic or other appropriate maps, and the pollutants may be apportioned according to the ratio of track miles in a given grid to the summation of total track miles in the county. If a grid contains segments of more than one county, the above procedure should be followed for each county, and the combined emissions should be reported for the grid. Yard operations must be distributed separately from information on fuel consumption by switch engines.

7.3.3 Apportioning Vessel Emissions to Grids

Emissions from this source category are best estimated by obtaining from local shipping and tugboat companies the quantity of fuel consumed by their vessels while in the study area. Because many companies might not know how much fuel is being burned, it might be advisable in those study areas with substantial vessel activity to survey a representative number of vessels.

If such a survey is not feasible, and if local companies cannot estimate the quantity of fuel being used, the total vessel operations in the area should be determined. These data are available from officials of shipping lines, harbor authorities, and Waterborne Commerce of the United States.[10]

Air pollutant emissions resulting from vessel operations may be divided into two groups--emissions that occur when the ship is under way and emissions that occur when the ship is docked or in berth. Excluding the Great Lakes, vessel traffic, oil-fired vessels account for most of the shipping in the United States. When fuel data for ships are not available, rough estimates can be made from the total vessel operations in the study area. For underway emissions it can be assumed that a ship burns from 19 to 42 gallons of oil per mile (Chapter 5). At dockside, ships may burn from 660 to 1900 gallons per day maintaining utilities aboard ship--lights, heat, pumps, refrigeration, ventilation, etc. (Chapter 5). Furthermore, it can be assumed that a ship remains at dockside from 2 to 3 days. The miles of ship channels in each grid can be calculated from maps. The miles of docks can be apportioned to grids on the basis of location from map information or at least by visual observation of the dock area. Total dock area can be listed by percentages in grid zones, and miles of channels can be apportioned by percentages in each grid zone. Because the docking area may be spread throughout the study zone, it may be desirable to establish an average distance traveled by ships when under way in the study area. Then, assuming that all entering ships also leave, the estimated underway mileage must be doubled to account for underway emissions produced when entering and leaving port. This doubled mileage figure is then multiplied by the number of ships entering the port and by fuel consumption per mile to get the amount of oil burned per year by vessels under way.

The amount of oil burned at dockside is estimated by multiplying the average number of days in port (3 days) by the number of ships entering the port per year and by multiplying the result by the average fuel consumption per day while the ships are in port (for example, 1600 gallons per day is an average for the combined total of motorships and steamships). This computation gives the amount of oil burned in port per year. By the use of emission factors, total emissions from vessels under way and at dockside can be determined. These totals are then apportioned among the grids on the basis of the percentages of dock area and channel mileage existing in each grid zone.

Admittedly this method gives a rough estimate of emissions. It ignores tugboat operations, emissions from vessels maneuvering at dockside, differences in ship size, etc., but in many instances the emissions from vessels will be a negligible contribution to the total emissions. If vessel movement is a significant activity in the study area, better data will be available, and better estimates of emissions and their distribution by grid zone can be made.

7.4 APPORTIONING OF LOSSES FROM GASOLINE MARKETING TO GRIDS

Hydrocarbon evaporative losses for the study area are calculated with emission factors. Because many hours are required to locate all service stations and place them onto grids, an acceptable practice is to apportion the estimated emissions from service station operations on the basis of either population or vehicle miles. The gallonage estimated for motor vehicle use should be the basis for determining evaporative losses.

7.5 APPORTIONING OF SOLID WASTE DISPOSAL TO GRIDS

Burning in dumps and in some incinerators is considered a point source emission and is listed according to the UTM coordinates of the source. Emissions that must be apportioned as area sources include on-site incineration and on-site open burning. The grids in the county are rated on the basis of land-use, population density, and industrial and commercial development. The rating system could be established by estimating the percentage of each grid that is devoted to residential, commercial, and industrial use. The percentages for each category are totaled for the county, and the ratio of the percentage in the grid to the county total is used to distribute the emissions for each appropriate source category. Source information gathered according to the methods of Chapter 5 gives the percentage of solid waste that is industrial, commercial, or residential in origin. Once the quantities of solid waste in each category have been allocated to grids, emission factors can be applied to the solid waste disposal methods to determine quantities of pollutants released.

7.6 APPORTIONING OF RESIDENTIAL FUEL SOURCES TO GRIDS

Residential sources are considered to be area sources. If large apartment complexes use oil or coal as a fuel, it will be necessary to survey and pinpoint these complexes for more accurate pollutant calculations. These large sources are then easily located on the grid system as point sources; the area source classification remains. After residential fuel consumption data are obtained, it is necessary to obtain aid from local officials in apportioning these oil, coal, and gas data to the correct areas. When this type of information is not available, it is necessary to estimate the number of dwelling units in a given census tract that is using each type of fuel, based on the same percentage as the county or SMSA. Further apportioning will be necessary to reduce these data to a grid basis. References for obtaining countywide data on space heating are given in Section 7.2.

Example 7-2. Estimation of a Census Tract's Contribution of Space Heating Units to a Grid.

Given: (1970 Census Data)

I. Of 100,000 dwelling units (d. u.) in County A
10,000 d. u. use coal,
40,000 d. u. use oil,
35,000 d. u. use gas, and
15,000 d. u. use electricity.

II. Census tract 1 (CT-1) in County A has 5000 dwelling units.

III. It is estimated from a grid overlay of the County A census tract map that 20 percent (0.2) of CT-1 is in grid 4.

Calculations:

I. Electrical space heating is not considered an area source because the power-generating facility will be a point source of emissions at the location of the plant.

II. Number of space heating units in CT-1 that are in grid 4:

Coal: $\left(\frac{\text{10,000 d. u. use coal}}{\text{100,000 d. u. in county}}\right)$ (5,000 d. u. in CT-1) (0.2) = 100 d. u. use coal

Oil: $\left(\frac{40,000 \text{ d. u. use oil}}{100,000 \text{ d. u. in county}}\right)$ (5,000 d. u. in CT-1) (0.2) = 400 d. u. use oil

Gas: $\left(\frac{35,000 \text{ d. u. use gas}}{100,000 \text{ d. u. in county}}\right)$ (5,000 d. u. in CT-1) (0.2) = 350 d. u. use gas

In many instances it will be necessary to update census tract data before they can be apportioned onto the grids. City and county planning commissions usually have recent population and dwelling unit estimates by census tract. Below is a general technique for updating residential fuel usage (including space, water, heating, cooking, etc.) by census tract.

The following data must be available (either published or estimated):

1970 d. u. by census tract
1970 d. u. using coal for space heating by census tract
1970 d. u. using oil for space heating by census tract
1970 d. u. using gas for space heating by census tract
197X d. u. by census tract (estimated)

The percentage of units built since 1970 that use oil, gas, or electricity for heating must be determined (usually from local gas companies). Very few homes built since 1970 use coal as a heating fuel. Information is also needed on the percentage of homes that have converted fuel types since 1970. These conversions are usually from coal to gas, oil, or electricity. This information is also usually available from local utility companies. If there has been a decrease in the number of dwelling units for a given census tract, then a corresponding decrease should be made in the number of units using coal or oil. This adjustment is understandable because most of the razed units are older buildings, which tend to burn coal and oil.

It is assumed, unless known data indicate otherwise, that residential use of coal is for space-heating purposes only. Some oil and large amounts of gas are used for water heating and cooking, along with the normal usage for space heating.

From past experience, it has been found that 250 gallons of oil per year is consumed per water heating and cooking unit, and, unless known otherwise, this oil can be considered distillate oil. Using Census Bureau data on water heating and cooking units, oil usage for this purpose can be determined and then distributed in proportion to the number of dwelling units using oil for heating.

The natural gas usage for water heating and cooking for a county is the difference between the quantity supplied by the natural gas companies and that calculated for space heating using the dwelling unit data. The differential amount of gas is allocated to emission zones in proportion to the number of dwelling units using gas for heating.

Anthracite and bituminous coal, distillate and residual oil, natural gas, liquefied petroleum gas, and wood are used residentially. As previously shown in Chapter 5, anthracite and bituminous coal used commercially and residentially can be estimated for a given county.

Fuel requirements for space heating are a product of four factors--number of dwelling units, fuel consumption per dwelling unit based on degree-days, number of degree-days, and a factor that corrects for the average number of rooms in a house. Fuel consumption is based on the average of five rooms per dwelling. A correction factor is necessary if the average dwelling in the county does not have five rooms. Table 7-3 gives fuel consumption data for a five-room residence.

Table 7-3. AVERAGE FUEL CONSUMPTION
FOR A FIVE-ROOM RESIDENCE[11]

Fuel	Consumption
Natural gas	22.5 ft^3/dwelling unit-degree-day
Fuel oil	0.18 gallon/dwelling unit-degree-day
Coal	0.00012 ton/dwelling unit-degree-day

The following example illustrates the procedures used to update and estimate residential fuel consumption.

Example 7-3. Updating and Estimating Residential Fuel Consumption by Grid.

Given:

I. 1970 county and census-tract data have been distributed onto grids. The following data are available for one grid in the county:

	County A	Grid 4
1970 population	300,000	10,000
1970 dwelling units (d. u.)	100,000	4,000
1970 d. u. using coal	10,000	500
1970 d. u. using oil	40,000	1,300
1970 d. u. using gas	35,000	1,800
1970 d. u. using electricity	15,000	400

II. Local planning commission population and housing estimates for County A in 1971 are as follows:

1. 1971 population 315,000
2. 1971 dwelling units 105,000
3. Five percent of County A dwelling units are in structures of 50 or more units. Assume that this holds true for grid 4 and that residual fuel oil is used in these structures for space heating.

III. Since 1970, according to the local gas company:

1. Ten percent of the dwelling units using coal have switched to gas.
2. Five percent of the dwelling units using oil have switched to gas.
3. Eighty percent of the homes built since 1970 are heated with gas and 20 percent with electricity.
4. Total residential gas sales for 1971 are 9.1×10^9 ft^3.

IV. Other:

1. In 1971, 20 percent of coal burned was anthracite and 80 percent was bituminous.
2. 1971 degree-days (°day) = 5.000 °day.
3. Average number of rooms per dwelling unit = 5.5 rooms.
4. Dwelling units in County A using oil for water heating = 21,000 d. u.

Calculations:

I. Update grid population from 1970 to 1971.

$(\frac{315,000}{300,000})$ (10,000 pop.) = 10,500 population in grid 4

II. Update grid housing data from 1970 to 1971.

$(\frac{10,500}{10,000})$ (4,000 d. u.) = 4,200 d. u. in grid 4

III. Estimate 1971 coal usage for space heating in grid 4

A. Dwelling units:

500 - (0.1) (500) = 450 d. u. using coal.

B. Tons:

$(450 \text{ d. u.}) (\frac{0.0012 \text{ tons coal}}{\text{d.u./°day}}) (5,000 \text{ °day}) (\frac{5.5}{5})^* = 2970 \text{ tons}$

1. Anthracite coal burned = (2,970 tons) (0.2) = 594 tons
2. Bituminous coal burned = (2,970 tons - 594 tons) = 2376 tons

---

* This is the needed correction factor for the average number of rooms per dwelling unit when using Table 7-3.

IV. Estimate 1971 oil usage for space heating and water heating in grid 4.

A. Dwelling units:

40,000 - (0.05) (40,000) = 38,000 d. u. using oil in County A
1,300 - (0.05) (1,300) = 1,235 d. u. using oil in grid 4

B. Gallons:

$(1{,}235 \text{ d. u.}) \left(0.18 \frac{\text{gallons oil}}{\text{d.u./°day}}\right) (5{,}000 \text{ °day}) \left(\frac{5.5}{5}\right)^{*} = 1{,}222{,}500$ gallons fuel oil used in grid 4.

1. Residual: All used in space heating of structures of 50 units or more. (1,222,500 gallons fuel oil) (0.05) = 61,125 gallons residual fuel oil used in grid 4
2. Distillate, space heating: 1,222,500 gallons fuel oil - 61,125 gallons residual = 1,161,375 gallons distillate fuel oil used for space heating in grid 4
3. Distillate, water heating: $(1{,}235 \text{ d. u.}) \left(\frac{20{,}000 \text{ d. u.}}{30{,}000 \text{ d. u.}}\right) \left(\frac{250 \text{ gallons oil}}{\text{d. u.}}\right) = 162{,}500$ gallons distillate fuel oil used for water heating in grid 4.

V. Estimate 1971 gas usage for space heating and other purposes (water heating, cooking, etc.).

A. Dwelling units:

The following formula is used in updating:

$$\begin{array}{c}\text{1970} \\ \text{gas users}\end{array} + \begin{array}{c}\text{Converted} \\ \text{from coal}\end{array} + \begin{array}{c}\text{Converted} \\ \text{from oil}\end{array} + \begin{array}{c}\text{New d. u.} \\ \text{using gas}\end{array} = \begin{array}{c}\text{1971 d. u.} \\ \text{using gas}\end{array}$$

County: 35,000 + 1,000 + 2,000 + 5,000 (0.80) = 42,000 d. u.
Grid: 1,800 + 50 + 75 + 200 (0.80) = 2,085 d. u.

B. Cubic feet of gas used:

1. Space heating:
   County: $(42{,}000 \text{ d.u.}) \left(22.5 \frac{\text{ft}^3}{\text{d.u./°day}}\right) (5{,}000 \text{ °day}) \left(\frac{5.5}{5}\right)^{*} =$
   5.2×10^9 ft^3 gas used in County A for space heating
   Grid: $(2{,}085 \text{ d.u.}) \left(22.5 \frac{\text{ft}^3}{\text{d.u./°day}}\right) (5{,}000 \text{ °day}) \left(\frac{5.5}{5}\right)^{*} =$
   258×10^6 ft^3 gas used in grid 4 for space heating
2. Total gas used in grid 4:
   $\left(\frac{9.1 \times 10^9 \text{ ft}^3}{5.2 \times 10^9 \text{ ft}^3}\right) (258 \times 10^6 \text{ ft}^3) = 451 \times 10^6 \text{ ft}^3$ gas used in grid 4, total
3. Gas used in grid 4 for other purposes:
   $451 \times 10^6 \text{ ft}^3 - 258 \times 10^6 \text{ ft}^3 = 193 \times 10^6 \text{ ft}^3$ gas used in grid 4 for other purposes

---

* This is the needed correction factor for the average number of rooms per dwelling unit when using Table 7-3.

If the above fuel totals for space heating, water heating, cooking, etc. are used, emissions from residential sources can be apportioned onto grids. If large individual sources can be identified, their fuel usage should be subtracted from the grid or census tract total to give the area source residential fuel.

7.7 APPORTIONING OF COMMERCIAL AND INSTITUTIONAL SOURCES TO GRIDS

Large commercial and institutional sources should be surveyed by questionnaire or personal contact and classified as point sources. The fuel used by these sources can be subtracted from the total estimates of commercial and institutional fuel for the county. The remaining fuel for commercial and institutional sources can be apportioned to the grid zones based on a rating system that is appropriate for the county under consideration. Apportioning can be established through knowledge of the area, land-use maps, contacts with local officials, and USGS topographical maps.

7.8 APPORTIONING OF MISCELLANEOUS SOURCES TO GRIDS

The occurrences of construction and demolition, forest fires, brush burning, agricultural burning, orchard heating operations, plowing and tilling, coal refuse fires, and debris burning are usually known if such activities are significant in the study area. These activities can be classified as point sources and apportioned onto grids on this basis. Emission estimates may be difficult, however, in situations where emission factors are unavailable. For example, although adequate emission factors for dust emissions caused by plowing and tilling are presently unavailable, these operations may be a significant source of particulates during dry, windy periods.

Road dust is treated as an area source that can be distributed if data on vehicle miles traveled on dirt roads are available. The quantity of dust created, which may be great in some areas and of little concern in others, will vary from season to season. The dust generated per mile traveled must be estimated or determined for each area of interest.

Industrial solvent losses are considered point source emissions and are apportioned accordingly. Commercial dry cleaning solvent losses are also best apportioned as point source emissions.

7.9 APPORTIONING OF POINT SOURCES TO GRIDS

Point source emissions are apportioned onto the grid zones using the UTM coordinates of the point source, as shown in Figure 7-6.

7.10 TOTALING GRIDDED EMISSIONS

For each grid the various point and area sources are now apportioned. For each surveyed pollutant in the grids, totals are summarized for annual average emissions and, generally, for summer and winter emissions also. This information can then be

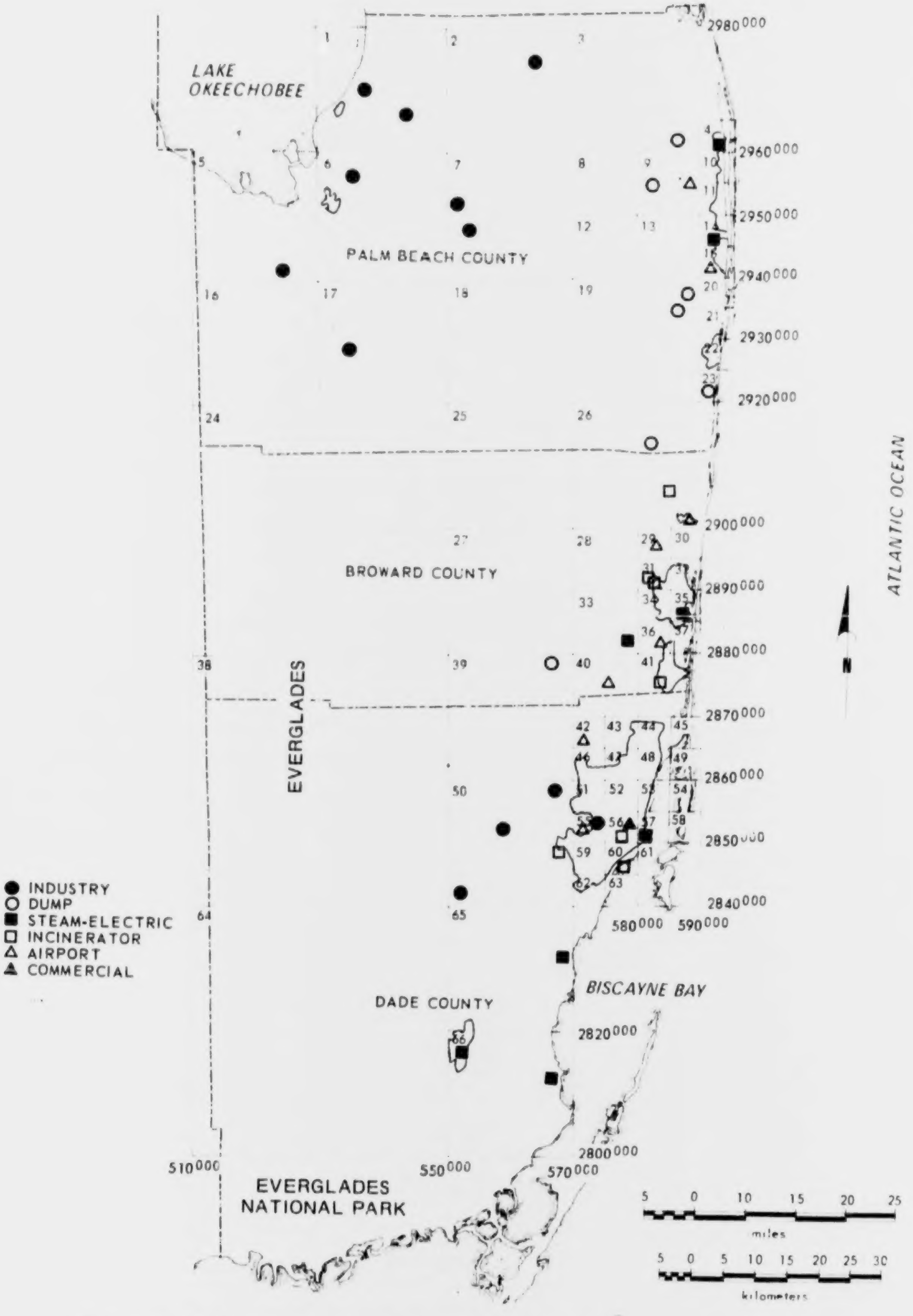
LAKE OKEECHOBEE
PALM BEACH COUNTY
BROWARD COUNTY
DADE COUNTY
EVERGLADES
EVERGLADES NATIONAL PARK
BISCAYNE BAY
ATLANTIC OCEAN
N
● INDUSTRY
○ DUMP
■ STEAM-ELECTRIC
□ INCINERATOR
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Figure 7-6. Point source locations for example study area.[5]

presented as shown in Table 7-4. From this table emission density maps can be constructed for each pollutant as shown in Figures 7-7 through 7-9. In some cases, more than one air pollution jurisdiction may exist in the study area (city, county), and in such instances it is helpful to delineate the boundaries of the jurisdictions on the various maps. For agency purposes, a map utilizing shaded plastic overlays is desirable in comparing emission densities and geographic origin between pollutants. A suggested master map form is the USGS topographical series, which has the UTM grid ticks already established. This map is also extremely useful in comparing emission densities with possible sources shown on the map.

7.11 REFERENCES

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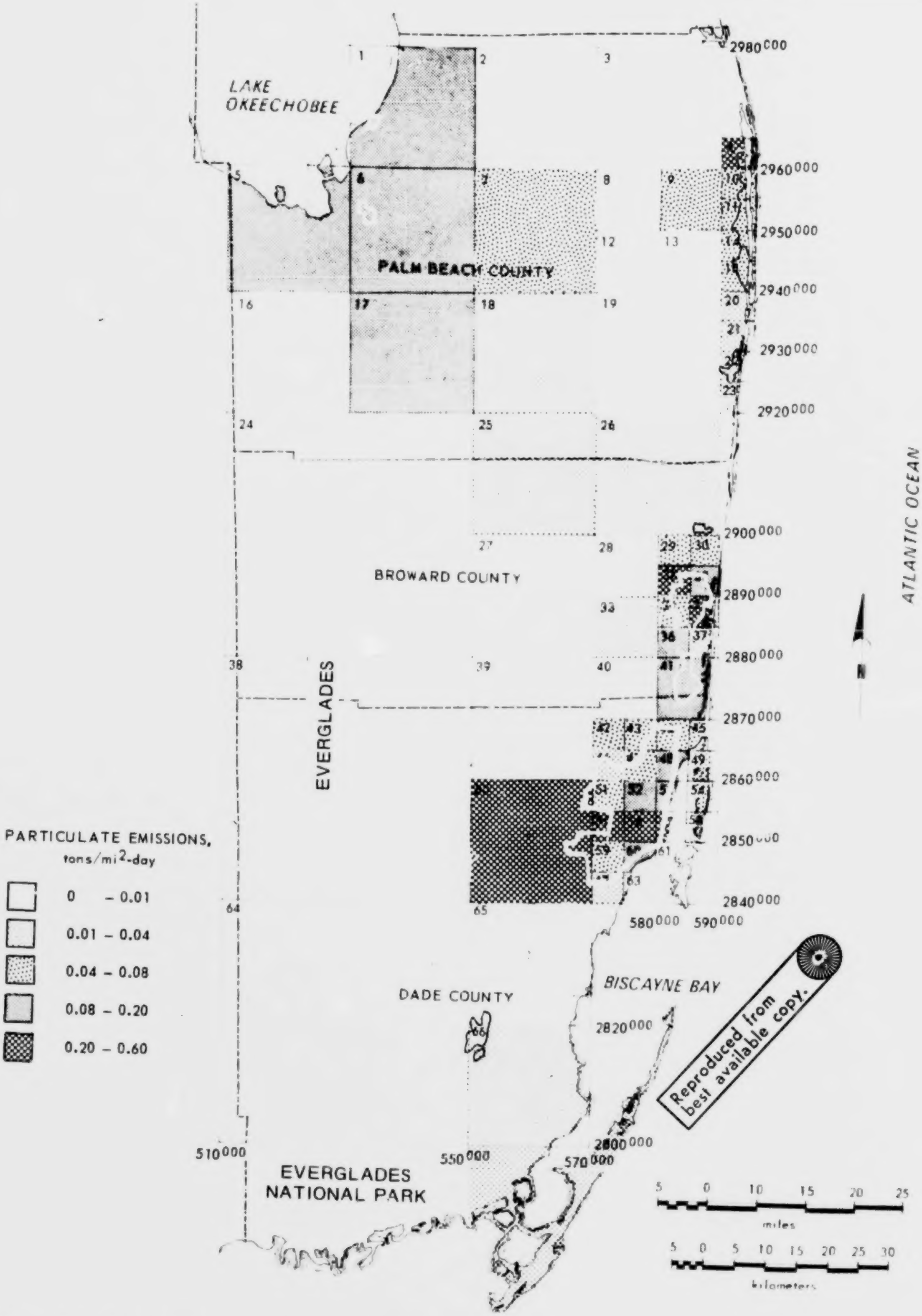
9. Shipments of Fuel Oil and Kerosene. U.S. Department of the Interior, Bureau of Mines. Washington, D.C. 1970.
10. Waterborne Commerce of the United States. U.S. Department of the Army, Corps of Engineers. New Orleans, Louisiana. 1970.
11. Statewide Emissions Inventory for Oklahoma. U.S. Environmental Protection Agency, Region VI. Final report for EPA Contract No. 68-02-0042. Dallas, Texas. October 15, 1971.

Table 7-4. SUMMARY OF AIR POLLUTANT EMISSIONS FROM ALL SOURCES IN THE EXAMPLE STUDY AREA[5]

(tons/day)

7-27

Grid	Land Area	SOx			PARTICULATES			CO			HYDROCARBONS			NOx		
		S	W	A	S	W	A	S	W	A	S	W	A	S	W	A
1	154.4	0.4	0.8	0.5	24.7	24.7	24.7	7.3	7.7	7.4	94.1	94.1	94.1	0.3	0.4	0.3
2	154.4	3.7	6.1	4.3	0.4	0.6	0.4	0.8	1.6	1.1	233.2	233.2	233.2	1.5	2.6	1.8
3	154.4	0.2	0.3	0.2	0.5	0.8	0.6	27.0	52.8	35.6	191.3	191.3	191.3	1.9	3.7	2.5
4	9.6	107.7	77.5	76.1	3.4	2.8	2.6	27.7	55.1	36.8	5.2	7.8	5.9	39.1	30.0	28.4
5	154.4	0.7	1.4	0.9	14.4	14.5	14.5	7.0	7.2	7.1	94.0	94.1	94.0	0.3	0.5	0.4
6	154.4	0.3	0.5	0.3	25.2	25.2	25.2	26.9	27.6	27.1	189.3	189.3	189.3	0.6	0.7	0.7
7	154.4	0.7	1.1	0.8	7.5	7.5	7.5	22.8	26.2	24.0	236.0	236.0	236.0	0.8	1.1	0.9
8	38.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	69.8	69.8	69.8	0.1	0.1	0.1
9	38.6	0.2	0.5	0.3	1.3	1.6	1.4	28.3	44.9	33.8	29.3	31.7	30.1	2.3	3.8	2.7
10	9.6	0.3	1.0	0.5	0.3	0.7	0.4	35.1	69.7	46.7	5.0	8.2	6.1	1.2	3.0	1.7
11	9.6	0.5	1.4	0.7	0.4	0.9	0.6	46.3	91.9	61.5	6.8	10.9	8.1	1.5	4.0	2.3
12	38.6	0.0	0.1	0.0	0.1	0.1	0.1	4.6	9.2	6.1	70.5	71.1	70.7	0.4	0.7	0.5
13	38.6	0.2	0.4	0.3	0.4	0.7	0.5	29.9	59.4	39.7	5.5	9.7	6.9	2.1	4.1	2.8
14	9.6	0.7	1.5	0.9	0.5	1.0	0.7	47.6	94.6	63.3	7.0	12.0	8.7	3.5	5.9	3.9
15	9.6	0.4	1.1	0.6	0.5	0.8	0.6	28.5	52.8	36.6	5.4	8.3	6.4	1.6	3.6	2.2
16	154.4	0.0	0.0	0.0	1.0	1.0	1.0	6.5	6.5	6.5	256.8	256.8	256.8	0.1	0.1	0.1
17	154.4	0.3	0.6	0.4	13.5	13.5	13.5	26.1	26.1	26.1	259.1	259.1	259.1	0.6	0.6	0.6
18	154.4	0.0	0.0	0.0	3.1	3.1	3.1	19.5	19.5	19.5	258.3	258.3	258.3	0.4	0.4	0.4
19	154.4	0.2	0.4	0.3	0.6	0.9	0.7	29.5	57.5	38.9	146.7	146.7	146.7	2.2	4.1	2.8
20	9.6	0.2	0.6	0.3	0.2	0.4	0.3	13.3	26.2	17.6	2.6	4.3	3.2	0.9	2.0	1.2
21	9.6	0.1	0.4	0.2	0.2	0.3	0.2	9.1	17.9	12.0	2.0	3.1	2.4	0.6	1.5	0.9
22	9.6	0.6	0.7	0.7	0.2	0.3	0.2	10.3	20.4	13.7	2.1	3.4	2.6	0.7	1.3	0.9


LAKE OKEECHOBEE
PALM BEACH COUNTY
BROWARD COUNTY
DADE COUNTY
EVERGLADES
EVERGLADES NATIONAL PARK
BISCAYNE BAY
ATLANTIC OCEAN
N
2980000
2960000
2950000
2940000
2930000
2920000
2900000
2890000
2880000
2870000
2860000
2850000
2840000
2820000
2800000
510000
550000
570000
580000
590000
1
2
3
5
6
7
8
9
10
12
13
16
17
18
19
20
21
23
24
25
26
27
28
29
30
33
36
37
38
39
40
41
42
43
45
49
51
52
54
58
61
63
64
65
66
PARTICULATE EMISSIONS, tons/mi²-day
0 – 0.01
0.01 – 0.04
0.04 – 0.08
0.08 – 0.20
0.20 – 0.60
5 0 10 15 20 25
miles
5 0 5 10 15 20 25 30
kilometers

Reproduced from best available copy.

Figure 7-7. Particulate emission densities from all sources in example study area.[5]

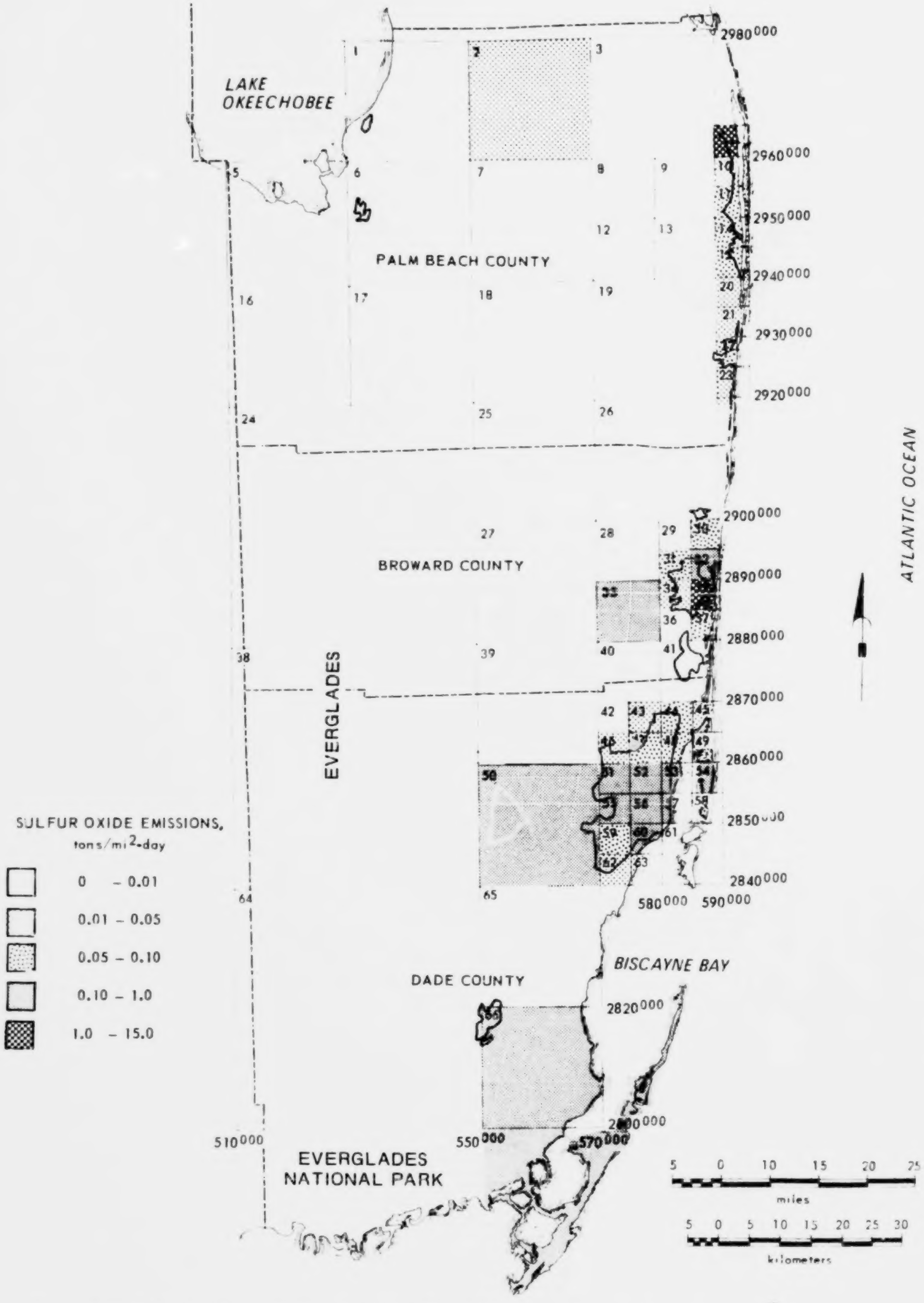

LAKE OKEECHOBEE
PALM BEACH COUNTY
BROWARD COUNTY
DADE COUNTY
EVERGLADES
EVERGLADES NATIONAL PARK
BISCAYNE BAY
ATLANTIC OCEAN
2980000
2960000
2950000
2940000
2930000
2920000
2900000
2890000
2880000
2870000
2860000
2850000
2840000
2820000
2800000
510000
550000
570000
580000
590000
SULFUR OXIDE EMISSIONS, tons/mi²-day
0 – 0.01
0.01 – 0.05
0.05 – 0.10
0.10 – 1.0
1.0 – 15.0
5 0 10 15 20 25
miles
5 0 5 10 15 20 25 30
kilometers

Figure 7-8. Sulfur oxides emission densities from all sources in example study area.[5]

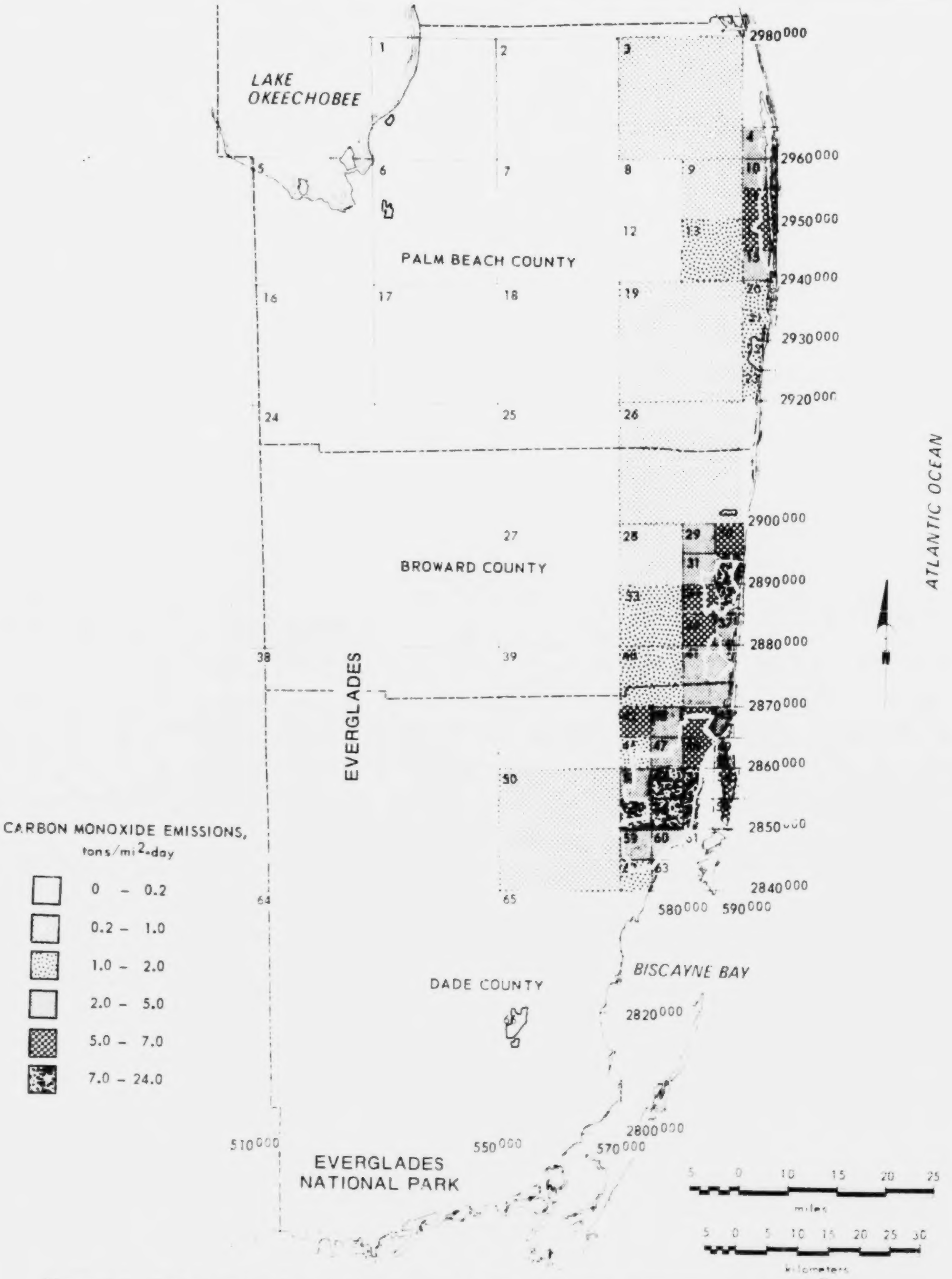

LAKE OKEECHOBEE
PALM BEACH COUNTY
BROWARD COUNTY
DADE COUNTY
EVERGLADES
EVERGLADES NATIONAL PARK
BISCAYNE BAY
ATLANTIC OCEAN
CARBON MONOXIDE EMISSIONS, tons/mi2-day
0 – 0.2
0.2 – 1.0
1.0 – 2.0
2.0 – 5.0
5.0 – 7.0
7.0 – 24.0
2980000
2960000
2950000
2940000
2930000
2920000
2900000
2890000
2880000
2870000
2860000
2850000
2840000
2820000
2800000
510000
550000
570000
580000
590000
miles
kilometers

Figure 7-9. Carbon monoxide emission densities from all sources in example study area.[5]

8. DISPERSION MODELING

8.1 INTRODUCTION

Dispersion modeling is a mathematical method of calculating the expected distribution of air pollutants over an area based on emission, meteorological, and topographical data for that area. To be able to "model" an area is one reason for obtaining an emission inventory. Because of the mathematical complexity of modeling, computers are often used to carry out the calculations. Although several methods are available for these calculations, only two are regularly used--the Air Quality Display Model[1] (AQDM), and the Air Quality Implementation Planning Program[2] (IPP). The latter is the more extensive because it incorporates cost control models and various control strategy options in addition to the dispersion modeling feature. Operational computer programs are available for both methods.

8.2 USES OF DIFFUSION MODELS

The basic output of a diffusion model is a prediction of pollutant concentration distribution. The distribution is usually displayed as a series of contours of constant concentrations (isopleths) on a map of the region. When air quality measurements are available, the model predictions at those sites are compared with the measured values, and a calibration diagram is produced. The correlation (r) between predicted and measured concentrations should be 0.7 or more. If r is less than 0.7, or if the isopleths show a pronounced excess or deficiency of concentration for no apparent reason, then errors in the source inventory are likely. Thus, a second use of the diffusion model is as a check on the accuracy of the source inventory.

Once the model has been calibrated or has been verified as giving a reasonable estimation of present or base-year conditions, it may be used to estimate the effect of future emission changes on air quality. These changes may be due to proposed emission regulations, expected new developments, or both. When data on fuel and other costs are added to a sufficiently detailed emission inventory, the costs of alternative control strategies (i.e., sets of emission limitations and fuel quality regulations) as well as their effectiveness may be estimated.

Finally, a computerized model may yield a list of the contributions of each point and area source to the concentrations at selected points. This source-contribution file is valuable in designing effective and economical control strategies.

8.3 EMISSION INVENTORY AND OTHER DATA NEEDED FOR MODELING

The emission data needed for dispersion modeling are more detailed than those that have normally been collected to date. Places for all emission data required are provided in the format. The data requirements for both IPP and AQDM are:

A. Point Sources:
   1. Region.
   2. SIC code.
   3. Site number.
   4. Process code (Appendix A, Section 4).
   5. Descriptive name.
   6. UTM coordinates (nearest 100 meters).
   7. Political jurisdiction (e.g., county).
   8. Owner (public, private).
   9. Emission rate (tons per day for SO_2, particulates).
   10. Operating time (hr/yr).
   11. Shifts/day.
   12. Control device identification (Appendix A, Section 3).
   13. Control efficiency (percent for SO_2, particulates).
   14. Boiler capacity (10^6 Btu/hr).
   15. Fuel heat content (Btu/unit for coal, residual oil, distillate oil, gas).
   16. Fuel burned (units/day for coal, residual oil, distillate oil, and gas).
   17. Sulfur content (%).
   18. Coal ash content (%).
   19. Stack height (ft).
   20. Stack-gas temperature (^oF), exit-gas velocity (ft/sec), stack diameter (feet), normalized plume rise (ft^2/sec).
   21. Maximum process rate (10^2 lb/hr).
   22. Maximum exhaust gas velocity (10^2 actual ft^3/min).
   23. Use factor.

B. Area Sources:
   1. UTM coordinates, southwest corner of grid (nearest 100 meters).
   2. Emission density (tons per day-Rm^2 of SO_2, particulates).
   3. Average stack height (m).

   A semimanual computerized method of gridding and apportioning area sources is available and will considerably decrease the time requirements of this operation.

C. Other data: Modeling requirements and meteorological and topographical data; if a cost model is used, fuel and miscellaneous cost data. These data must be obtained elsewhere.

8.4 REFERENCES

1. Air Quality Display Model. TRW Systems Group. U.S. Environmental Protection Agency, NAPCA. Washington, D.C. November,1970.
2. Air Quality Display Model, Implementation Planning Program. TRW Systems Group. U.S. Environmental Protection Agency, NAPCA. Washington, D.C. November 1970.

9. QUESTIONNAIRES

9.1 GENERAL INFORMATION

The questionnaire for point sources is the most widely used and expeditious method of collecting emission inventory information. The use of the questionnaire can produce problems, especially if the "questionnaire survey" is not properly conducted. These problems may be grouped into two main categories: questionnaire design and survey administration.

The proper design includes establishment of a suitable format for the questionnaire, selection of the appropriate questions, proper wording of questions, and authorship of an appropriate cover letter. The basic rule is to design the questionnaire and the letter for the person who will be asked to complete it. When an engineer is designing a questionnaire, he may overlook the fact that the person who will complete the questionnaire may not have the benefit of a technical background in air pollution. Also, the respondent may not have benefit of the engineer's assistance when completing the forms.

The format of the questionnaire should be as simple and functional as possible. Time will be saved if the format design is such that a keypunch operator can code the information directly from the questionnaire onto the cards. The format should then be in line with the example coding form formats of Chapters 4 and 5. If the inventory is not computerized, the questionnaires might follow the format suggested by the example questionnaires in Appendix D. Only information that can be used should be solicited; the questions should be well spaced to ensure that they are easy to read, yet placed on as few pages as possible because most people tend to avoid long questionnaires. When writing the questions, use terminology with which the recipient will be familiar. Each question should be self-explanatory or accompanied by clear directions. All information that will be utilized should be asked for initially, thus avoiding requests for additional data at a later time. The agency may wish to coordinate the emission inventory with the establishment of a permit system or a source registration system.

The questionnaire should be accompanied by a letter of transmittal. The example in Appendix D shows the information that should be contained in this cover letter. Before the questionnaire is due to be returned, a second letter may be sent out reminding the recipient of the need for the completed questionnaire. The second letter is sent as a reminder only and should be worded so as not be be construed by the recipient as harassment on the part of the agency. When the completed questionnaire has been returned, a short letter of appreciation should be sent to the party returning the questionnaire.

The administrative portion of the questionnaire survey includes all operations necessary to have the completed questionnaires distributed and processed by the agency. The optimum procedure, which can be followed in the administrative portion, will minimize the amount of time spent by technical staff. These procedures will require secretarial, clerical, and keypunch help in the agency to be used whenever possible.

10. EPA DATA SYSTEM FOR ATMOSPHERIC EMISSIONS

10.1 CONCEPT OF NEDS

The concept of the computerized emissions data system was previously given in Figure 2-1; the data storage and identification files are shown on the left side of the diagram and the ADP operations are indicated on the right. Recently the National Source Inventory Section (NSIS) of OAP has begun to set up such a system for a nationwide emission inventory. The ADP and data bank are called the National Emissions Data System (NEDS) and utilize the formats for data storage (Appendix B), the ADP procedures, and the source inventory and emission factor methodology specified earlier in this text.

NEDS is made up of the main system as described by cards 1 through 6 of the point source form and cards 1 through 5 of the area source form, as well as a variable data subsystem. The main system has been explained in Chapters 4 and 5, and reference was made to part of the subsystem in Chapter 6. The format for the main system is fixed; however, for the variable data subsystem, a format will be defined for the usable columns 18 through 72 by the users as each card identification number is assigned. The identification number is composed of an alphabetic letter in column 77 and right-justified numbers (from 001 to 999) in columns 78 through 80. The result is that, for each point source, approximately 26,000 cards can be stored. Any user desiring storage space for sources may request assignment of number of variable data cards by merely submitting a proposed format (together with details for completion) to the National Source Inventory Section, which will check for conformity with previously developed procedures. For example, cards A001 through A999 will be used by the National Source Inventory Section for data pertinent to their requirements--such as A001 and A002 for hazardous pollutants and trace elements.

All emission factor information is stored separately in the emission factor file; this permits changes at any time in the emission factor files (about 900 cards) without modification to the source files (about 300,000 cards). The formats for storage in the source and emission factor files are given in Appendix B, Sections 1, 2, and 3; the SCC identification numbers are given in Appendix A, Section 2. After the data files for NEDS are completed, this valuable tool for decision-making and control strategies will likely become the major reference for EPA policy in which emissions are considered.

10.2 POINT AND AREA SOURCE INVENTORIES FOR NEDS

Point sources may be generally defined as sources that emit more than a specific amount of pollutant and are identified individually, whereas area sources emit less than the specific amount and are apportioned over some geographic area. This definition usually applies primarily to SO_x, NO_x, CO, hydrocarbons, and particulates.

For the purpose of the NEDS inventories discussed in this chapter, point sources of the above pollutants are defined in Appendix C. The current 100 ton/year minimum level of emissions for point sources may be lowered to some lesser value after the "100-ton inventory" for NEDS is complete.

The criterion for specifying as point sources those facilities that emit at least 100 tons of a contaminant per year is based on the probable degradation by such a facility of ground level air quality. If it is assumed that an installation emits no more than 100 tons per year of a contaminant from a low stack, that it is located in an area where the average wind speed is less than the average throughout the country, that no wind direction occurs more often than 25 percent of the time at the site, and that atmospheric stability conditions in the vicinity occur with normal frequency, then the area most contaminated by the emissions would experience an annual average concentration of 5 to 8 micrograms per cubic meter. This concentration is about 10 percent of the secondary Federal annual air quality standard for sulfur dioxide or particulate matter.

Therefore, for the purpose of NEDS, it is conservative to classify as point sources only those facilities that emit at least 100 tons per year of the pollutants listed above. When considering hazardous (or potentially hazardous) pollutants or trace elements and compounds, point sources would be identified as every known emitter. When considering an inventory of selected source categories or source ownerships (Federal facilities, for example) every emitter would be listed. In many parts of the United States, emissions from Federal facilities may contribute to the total quantity of air pollutants in the area; therefore, source inventories of "federally-owned facilities" are being incorporated into the NEDS system by NSIS, OAP.

In NEDS, area sources are all sources of emissions not included as point sources; area source data are compiled on a countywide basis for both stationary and mobile sources. It is anticipated that gridding and apportioning techniques currently under development will facilitate conversion of the countywide totals to smaller areas for dispersion modeling. The countywide totals for area sources will also be compatible with the county identification numbers used on point sources, thereby permitting compilation of a nationwide inventory that will be subdivided into states and counties.

10.3 EMISSION FACTORS FOR NEDS

When fully operational, NEDS will automatically calculate emissions using the most up-to-date emission factors and current population data. The emission factor file will be periodically updated as new source test data become available; thus the computerized system will always use the best emission factors possible.

It will also be possible to compare the estimated emissions as stored in the data bank with the calculated emissions, and, by checking that the estimated emissions were a result of source tests, to make some quality judgment of the calculated emissions in general.

10.4 DATA RETRIEVAL ACCESS FOR NEDS

Any state or local agency that chooses to may request data from NEDS by telephone, mail, or, in future, by terminal access of the computer at the Research Triangle Park National Environmental Research Center.

Generally, three categories of data will be available: summaries, which will be most commonly used; sorting, a useful tool to be developed after summary techniques are finalized; and special analyses, techniques that will necessitate both terminal and programming capability. Each category is discussed below.

10.4.1 Summaries

A number of programs are under development that will provide the following summaries:

1. Nationwide inventory - by county (3,300), AQCR (247), state and territories (54), and the nation (1).
2. Area sources - by county (3,300), including tabulated data of cards 1 through 5 and calculated emissions of pollutants.
3. Point sources - individually (40,000) by county, including tabulated data of cards 1, 2, 3, 4, 6, 7 and calculated emissions of pollutants, trace elements and compounds.

10.4.1.1 Simple Summary Data Requests - Very brief data requests will be answered from monthly summaries or from the summaries output on the last day of the year (annual summaries). Annual summaries will be maintained for ADP and in computer printout form, stored on microfiche in NSIS. Monthly summaries will only be maintained on computer tape for ADP. The methods of answering simple requests are as follows:

1. Telephone requests to NSIS - Immediate answer will be given by telephone or, if many numbers are required, photocopies of the annual summaries from the microfiche will be mailed on the same day as the request, directed to the Chief, Air Branch of the EPA Regional Office for the area from which the request originated. The material will then be forwarded from the Regional Office, and in this manner confidentiality of data will be the responsibility of the Regional Office.
2. Mail requests to NSIS - Photocopies of summaries will be mailed in the same manner as for telephone requests.
3. Terminal requests to the computer - Immediate turnaround should be possible from monthly summaries.

10.4.1.2 Comprehensive Summary Data Requests - More complicated requests will probably require access of the computer by NSIS.

1. Telephone requests to NSIS - Five-day turnaround from the data received by NSIS is anticipated to enable NSIS to access the computer, obtain printout from monthly summaries, and mail to the regional air branch chief for forwarding.
2. Mail requests to NSIS - Such requests are handled in the same manner as telephone requests.
3. Terminal requests to the computer - Immediate turnaround should be possible from monthly summaries.

10.4.2 Sorting

A number of programs will be developed that will enable sorting and ranking of data. The methods for answering these requests will be the same as for comprehensive requests of summary data, except that sorting and/or ranking operations will be included.

10.4.3 Special Analysis

No programs will be developed for these operations; therefore, users must have their own programming capability until this need can be met by increased resources in NSIS.

10.5 UPDATING AND MAINTENANCE FOR NEDS

Three methods of updating the source files will be used:

1. New and modified source semi-annual reports - These reports will be routed to NSIS for use in revising source data.

2. Revisions - Any suggested revisions by local agencies, regional offices, etc. should be submitted by letter, telephone, or through computer terminal. The changes will be incorporated the last day of each month by NSIS.

3. NSIS "audit" procedures - Checks of the inventory will be made by selecting source categories, pollutants, or geographical areas to be investigated in depth by NSIS using available reports, data, etc. collected from a multitude of references.

The emission factors data file will be updated continuously as new information on source testing becomes available.

APPENDIX A
COMPREHENSIVE EMISSION INVENTORY IDENTIFICATION CODES

A.1 GEOGRAPHICAL IDENTIFICATION CODES

Environmental Protection Agency Regions are delineated and identified in Figure A-1. State and Air Quality Control Region (AQCR) numbers are listed following this figure. The states and the District of Columbia are listed alphabetically, and identification numbers are assigned sequentially. AQCR's are arranged alphabetically within each state according to the name specified in the Federal Register. The AQCR's are then numbered sequentially, following the same arrangement of states used for the state identification. Interstate AQCR's are included within the lowest-numbered state. AQCR's have been established for Puerto Rico, American Samoa, Guam, and the U.S. Virgin Islands. These AQCR's follow those of the states.

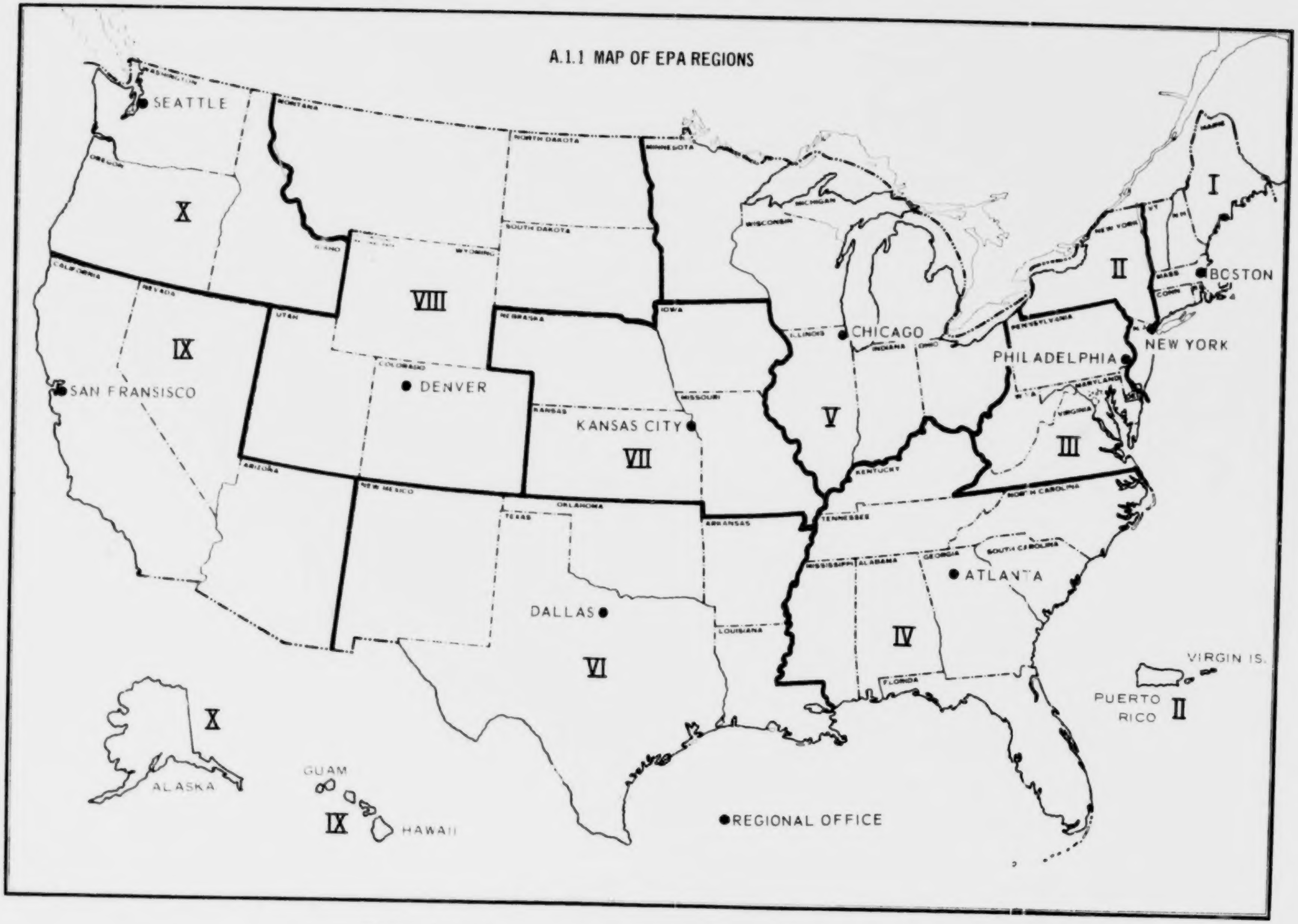

A.1.1 MAP OF EPA REGIONS
SEATTLE
WASHINGTON
OREGON
IDAHO
MONTANA
WYOMING
NORTH DAKOTA
SOUTH DAKOTA
MINNESOTA
NEBRASKA
IOWA
CALIFORNIA
NEVADA
UTAH
COLORADO
ARIZONA
NEW MEXICO
KANSAS
MISSOURI
OKLAHOMA
TEXAS
ARKANSAS
LOUISIANA
WISCONSIN
MICHIGAN
ILLINOIS
INDIANA
OHIO
KENTUCKY
TENNESSEE
MISSISSIPPI
ALABAMA
GEORGIA
SOUTH CAROLINA
NORTH CAROLINA
FLORIDA
VIRGINIA
MARYLAND
PENNSYLVANIA
NEW YORK
VT
NH
MASS
CONN
MAINE
I
II
III
IV
V
VI
VII
VIII
IX
X
SAN FRANSISCO
DENVER
KANSAS CITY
DALLAS
CHICAGO
PHILADELPHIA
NEW YORK
BOSTON
ATLANTA
VIRGIN IS.
PUERTO RICO
II
X
ALASKA
GUAM
IX
HAWAII
REGIONAL OFFICE

Figure A-1. Environmental Protection Agency Regions.

A.1.2 State Identification Numbers

State	Number
Alabama	01
Alaska	02
Arizona	03
Arkansas	04
California	05
Colorado	06
Connecticut	07
Delaware	08
District of Columbia	09
Florida	10
Georgia	11
Hawaii	12
Idaho	13
Illinois	14
Indiana	15
Iowa	16
Kansas	17
Kentucky	18
Louisiana	19
Maine	20
Maryland	21
Massachusetts	22
Michigan	23
Minnesota	24
Mississippi	25
Missouri	26
Montana	27
Nebraska	28
Nevada	29
New Hampshire	30
New Jersey	31

State	Number
New Mexico	32
New York	33
North Carolina	34
North Dakota	35
Ohio	36
Oklahoma	37
Oregon	38
Pennsylvania	39
Puerto Rico	40
Rhode Island	41
South Carolina	42
South Dakota	43
Tennessee	44
Texas	45
Utah	46
Vermont	47
Virginia	48
Washington	49
West Virginia	50
Wisconsin	51
Wyoming	52

A.1.3 Air Quality Control Region Identification Numbers

Region	Number
Alabama	
Alabama and Tombigbee Rivers	1
Columbus-Phenix City	2
East Alabama	3
Metropolitan Birmingham	4
Mobile-Pensacola-Panama City-Southern Mississippi (Fla., Miss.)	5
Southeast Alabama	6
Tennessee River Valley-Cumberland Mts. (Tenn.)	7
Alaska	
Cook Inlet	8

Region	Number
Alaska	
Northern Alaska	9
South Central Alaska	10
Southeastern Alaska	11
Arizona	
Arizona-New Mexico Southern Border (N. Mex.)	12
Clark-Mohave	13
Four Corners (Colo., N. Mex., Utah)	14
Phoenix-Tucson	15
Arkansas	
Central Arkansas	16
Metropolitan Fort Smith	17
Metropolitan Memphis	18
Monroe-El Dorado (La.)	19
Northeast Arkansas	20
Northwest Arkansas	21
Shreveport-Texarkana-Tyler (La., Okla., Texas)	22
California	
Great Basin Valley	23
Metropolitan Los Angeles	24
North Central Coast	25
North Coast	26
Northeast Plateau	27
Sacramento Valley	28
San Diego	29
San Francisco Bay Area	30
San Joaquin Valley	31
South Central Coast	32
Southeast Desert	33

Region	Number
Colorado	
Comanche	34
Four Corners (Ariz., N. Mex., Utah)	14
Grand Mesa	35
Metropolitan Denver	36
Pawnee	37
San Isabel	38
San Luis	39
Yampa	40
Connecticut	
Eastern Connecticut	41
Hartford-New Haven-Springfield (Mass.)	42
New Jersey-New York-Connecticut (N. J., N. Y.)	43
Northwestern Connecticut	44
Delaware	
Metropolitan Philadelphia (N. J., Pa.)	45
Southern Delaware	46
District of Columbia	
National Capital (Md.)	47
Florida	
Central Florida	48
Jacksonville-Brunswick (Ga.)	49
Mobile-Pensacola-Panama City-Southern Mississippi (Ala., Miss.)	5
Southeast Florida	50
Southwest Florida	51
West Central Florida	52
Georgia	
Augusta-Aiken (S. C.)	53
Central Georgia	54

Region	Number
Georgia	
Chattanooga (Tenn.)	55
Columbus-Phenix City (Ala.)	2
Jacksonville-Brunswick (Fla.)	49
Metropolitan Atlanta	56
Northeast Georgia	57
Savannah-Beaufort (S. C.)	58
Southwest Georgia	59
Hawaii	
Entire State	60
Idaho	
Eastern Idaho	61
Eastern Washington-Northern Idaho (Wash.)	62
Idaho	63
Metropolitan Boise	64
Illinois	
Burlington-Keokuk (Iowa)	65
East Central Illinois	66
Metropolitan Chicago (Ind.)	67
Metropolitan Dubuque (Iowa, Wisc.)	68
Metropolitan Quad Cities (Iowa)	69
Metropolitan St. Louis (Mo.)	70
North Central Illinois	71
Paducah-Cairo (Ky.)	72
Rockford-Janesville-Beloit (Wisc.)	73
Southeast Illinois	74
West Central Illinois	75
Indiana	
East Central Indiana	76

Region	Number
Indiana	
Evansville-Owensboro-Henderson (Ky.)	77
Louisville (Ky.)	78
Metropolitan Chicago (Ill.)	67
Metropolitan Cincinnati (Ky., Ohio)	79
Metropolitan Indianapolis	80
Northeast Indiana	81
South Bend-Elkhart-Benton Harbor (Mich.)	82
Southern Indiana	83
Wabash Valley	84
Iowa	
Burlington-Keokuk (Ill.)	65
Metropolitan Dubuque (Ill., Wisc.)	68
Metropolitan Omaha-Council Bluffs (Neb.)	85
Metropolitan Quad Cities (Ill.)	69
Metropolitan Sioux City (Neb., S. D.)	86
Metropolitan Sioux Falls (S. D.)	87
Northeast Iowa	88
North Central Iowa	89
Northwest Iowa	90
Southeast Iowa	91
South Central Iowa	92
Southwest Iowa	93
Kansas	
Metropolitan Kansas City (Mo.)	94
Northeast Kansas	95
North Central Kansas	96
Northwest Kansas	97
Southeast Kansas	98

Region	Number
Kansas	
South Central Kansas	99
Southwest Kansas	100
Kentucky	
Appalachian	101
Bluegrass	102
Evansville-Owensboro-Henderson (Ind.)	77
Huntington-Ashland-Portsmouth-Ironton (Ohio, W. Va.)	103
Louisville (Ind.)	78
Metropolitan Cincinnati (Ind., Ohio)	79
North Central Kentucky	104
Paducah-Cairo (Ill.)	72
South Central Kentucky	105
Louisiana	
Monroe-El Dorado (Ark.)	19
Shreveport-Texarkana-Tyler (Ark., Okla., Texas)	22
Southern Louisiana-Southeast Texas (Texas)	106
Maine	
Androscoggin Valley (N. H.)	107
Aroostook	108
Down East	109
Metropolitan Portland	110
Northwest Maine	111
Maryland	
Central Maryland	112
Cumberland-Keyser (W. Va.)	113
Eastern Shore	114
Metropolitan Baltimore	115
National Capital (D. C.)	47
Southern Maryland	116

Region	Number
Massachusetts	
Berkshire	117
Central Massachusetts	118
Hartford-New Haven-Springfield (Conn.)	42
Metropolitan Boston	119
Metropolitan Providence (R. I.)	120
Merrimack Valley-Southern New Hampshire (N. H.)	121
Michigan	
Central Michigan	122
Metropolitan Detroit-Port Huron	123
Metropolitan Toledo (Ohio)	124
South Bend-Elkhart-Benton Harbor (Ind.)	82
South Central Michigan	125
Upper Michigan	126
Minnesota	
Central Minnesota	127
Southeast Minnesota-La Crosse (Wisc.)	128
Duluth-Superior (Wisc.)	129
Metropolitan Fargo-Moorhead (N. D.)	130
Minneapolis-St. Paul	131
Northwest Minnesota	132
Southwest Minnesota	133
Mississippi	
Metropolitan Memphis (Ark., Tenn.)	18
Mississippi Delta	134
Mobile-Pensacola-Panama City-Southern Mississippi (Ala., Fla.)	5
Northeast Mississippi	135

Region	Number
Missouri	
Metropolitan Kansas City (Kans.)	94
Metropolitan St. Louis (Ill.)	70
Northern Missouri	137
Southeast Missouri	138
Southwest Missouri	139
Montana	
Billings	140
Great Falls	141
Helena	142
Miles City	143
Missoula	144
Nebraska	
Lincoln-Beatrice-Fairbury	145
Metropolitan Omaha-Council Bluffs (Iowa)	85
Metropolitan Sioux City (Iowa, S. D.)	86
Nebraska	146
Nevada	
Clark-Mohave (Ariz.)	13
Nevada	147
Northwest Nevada	148
New Hampshire	
Androscoggin Valley (Maine)	107
Merrimack Valley-Southern New Hampshire (Mass.)	121
New Hampshire	149
New Jersey	
Metropolitan Philadelphia (Dela., Pa.)	45
New Jersey	150
New Jersey-New York-Connecticut (N. Y., Conn.)	43
Northeast Pennsylvania-Upper Delaware Valley (Pa.)	151

Region	Number
New Mexico	
Albuquerque-Mid Rio Grande	152
Arizona-New Mexico Southern Border (Ariz.)	12
El Paso-Las Cruces-Alamogordo (Texas)	153
Four Corners (Ariz., Colo., Utah)	14
Northeastern Plains	154
Pecos-Permian Basin	155
Southwestern Mountains-Augustine Plains	156
Upper Rio Grande Valley	157
New York	
Central New York	158
Champlain Valley (Vt.)	159
Genesse-Finger Lakes	160
Hudson Valley	161
New Jersey-New York-Connecticut (N. J., Conn.)	43
Niagara Frontier	162
Southern Tier East	163
Southern Tier West	164
North Carolina	
Eastern Mountain	165
Eastern Piedmont	166
Metropolitan Charlotte (S. C.)	167
Northern Coastal Plain	168
Northern Piedmont	136
Sandhills	169
Southern Coastal Plain	170
Western Mountain	171
North Dakota	
Metropolitan Fargo-Moorhead (Minn.)	130
North Dakota	172

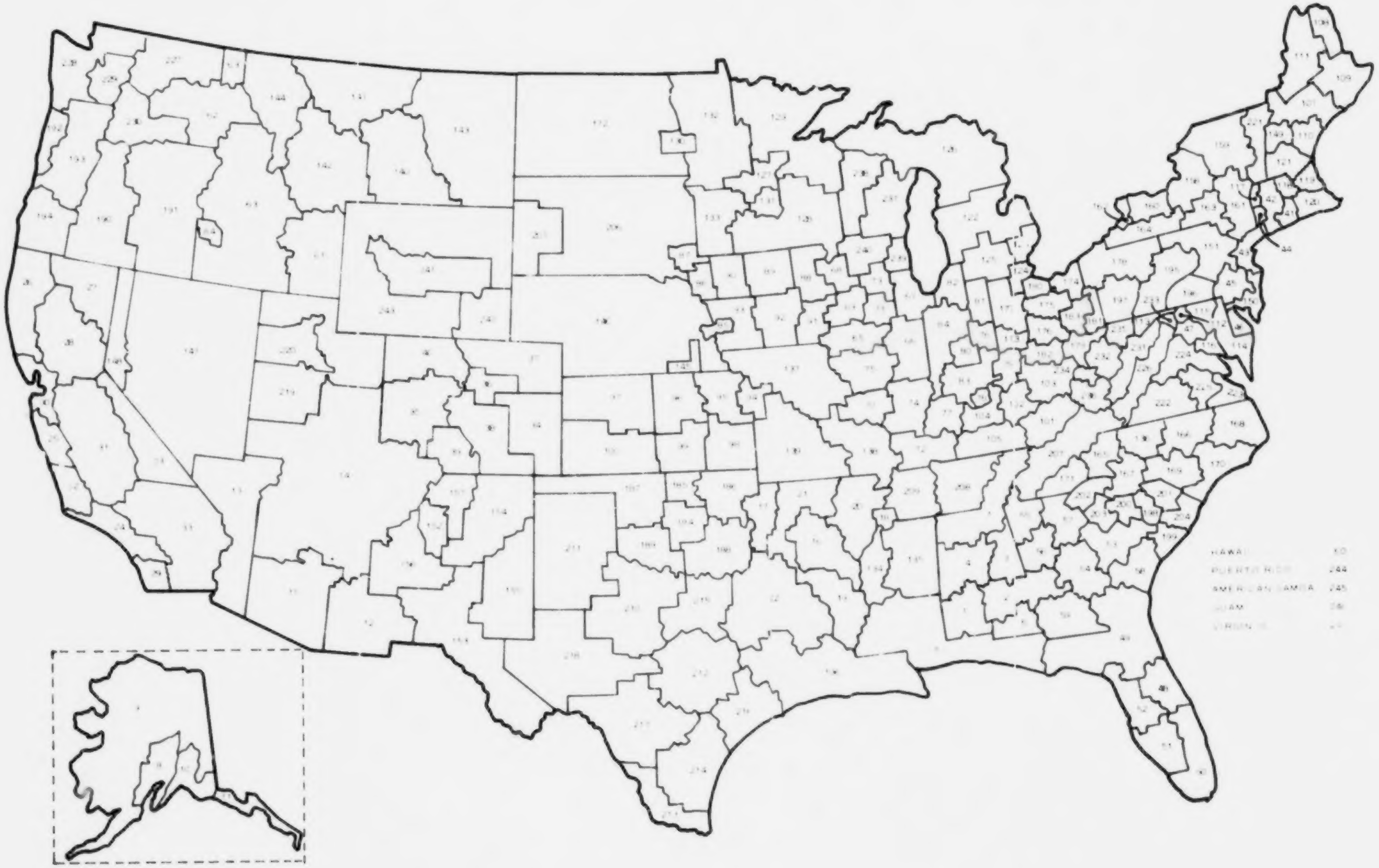
Region	Number
Ohio	
Dayton	173
Greater Metropolitan Cleveland	174
Huntington-Ashland-Portsmouth-Ironton (Ky., W. Va.)	103
Mansfield-Marion	175
Metropolitan Cincinnati (Ind., Ky.)	79
Metropolitan Columbus	176
Metropolitan Toledo (Mich.)	124
Northwest Ohio	177
Northwest Pennsylvania-Youngstown (Pa.)	178
Parkersburg-Marietta (W. Va.)	179
Sandusky	180
Steubenville-Weirton-Wheeling (W. Va.)	181
Wilmington-Chillicothe-Logan	182
Zanesville-Cambridge	183
Oklahoma	
Central Oklahoma	184
Metropolitan Fort Smith (Ark.)	17
North Central Oklahoma	185
Northeastern Oklahoma	186
Northwestern Oklahoma	187
Shreveport-Texarkana-Tyler (Ark., La., Texas)	22
Southeastern Oklahoma	188
Southwestern Oklahoma	189
Oregon	
Central Oregon	190
Eastern Oregon	191
Northwest Oregon	192
Portland (Wash.)	193
Southwest Oregon	194

Region	Number
Pennsylvania	
Central Pennsylvania	195
Metropolitan Philadelphia (Dela., N. J.)	45
Northeast Pennsylvania-Upper Delaware Valley (N. J.)	151
Northwest Pennsylvania-Youngstown (Ohio)	178
South Central Pennsylvania	196
Southwest Pennsylvania	197
Rhode Island	
Metropolitan Providence (Mass.)	120
South Carolina	
Augusta-Aiken (Ga.)	53
Camden-Sumter	198
Charleston	199
Columbia	200
Florence	201
Greenville-Spartanburg	202
Greenwood	203
Georgetown	204
Metropolitan Charlotte (N. C.)	167
Savannah-Beaufort (Ga.)	58
South Dakota	
Black Hills-Rapid City	205
Metropolitan Sioux City (Iowa, Neb.)	86
Metropolitan Sioux Falls (Iowa)	87
South Dakota	206
Tennessee	
Chattanooga (Ga.)	55
Eastern Tennessee-Southwestern Virginia (Va.)	207
Metropolitan Memphis (Ark., Miss.)	18

Region	Number
Tennessee	
Middle Tennessee	208
Tennessee River Valley-Cumberland Mountains (Ala.)	7
Western Tennessee	209
Texas	
Abilene-Wichita Falls	210
Amarillo-Lubbock	211
Austin-Waco	212
Brownsville-Laredo	213
Corpus Christi-Victoria	214
El Paso-Las Cruces-Alamagordo (N. M.)	153
Metropolitan Dallas-Ft. Worth	215
Metropolitan Houston-Galveston	216
Metropolitan San Antonio	217
Midland-Odessa-San Angelo	218
Shreveport-Texarkana-Tyler (Ark., La., Okla.)	22
Southern Louisiana-Southeast Texas (La.)	106
Utah	
Four Corners (Ariz., Colo., N. M.)	14
Utah	219
Wasatch Front	220
Vermont	
Champlain Valley (N. Y.)	159
Vermont	221
Virginia	
Central Virginia	222
Eastern Tennessee-Southwestern Virginia (Tenn.)	207
Hampton Roads	223
National Capital (D. C., Md.)	47

Region	Number
Virginia	
Northeastern Virginia	224
State Capital	225
Valley of Virginia	226
Washington	
Eastern Washington-Northern Idaho (Idaho)	62
Northern Washington	227
Olympia-Northwest Washington	228
Portland (Ore.)	193
Puget Sound	229
South Central Washington	230
West Virginia	
Allegheny	231
Central West Virginia	232
Cumberland-Keyser (Md.)	113
Eastern Panhandle	233
Huntington-Ashland-Portsmouth-Ironton (Ky., Ohio)	103
Kanawha Valley	234
North Central West Virginia	235
Parkersburg-Marietta (Ohio)	179
Southern West Virginia	236
Steubenville-Wierton-Wheeling (Ohio)	181
Wisconsin	
Duluth-Superior (Minn.)	129
Lake Michigan	237
Metropolitan Dubuque (Ill., Iowa)	68
North Central Wisconsin	238
Rockford-Janesville-Beloit (Ill.)	73
Southeastern Wisconsin	239

Region	Number
Wisconsin	
Southeast Minnesota-La Crosse (Minn.)	128
Southern Wisconsin	240
Wyoming	
Casper	241
Metropolitan Cheyenne	242
Wyoming	243
Puerto Rico	
Puerto Rico	244
American Samoa	
American Samoa	245
Guam	
Guam	246
U. S. Virgin Islands	
U. S. Virgin Islands	247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AMERICAN SAMOA 245
GUAM 246
VIRGIN IS. 247

Figure A-2. Federal Air Quality Control Regions.

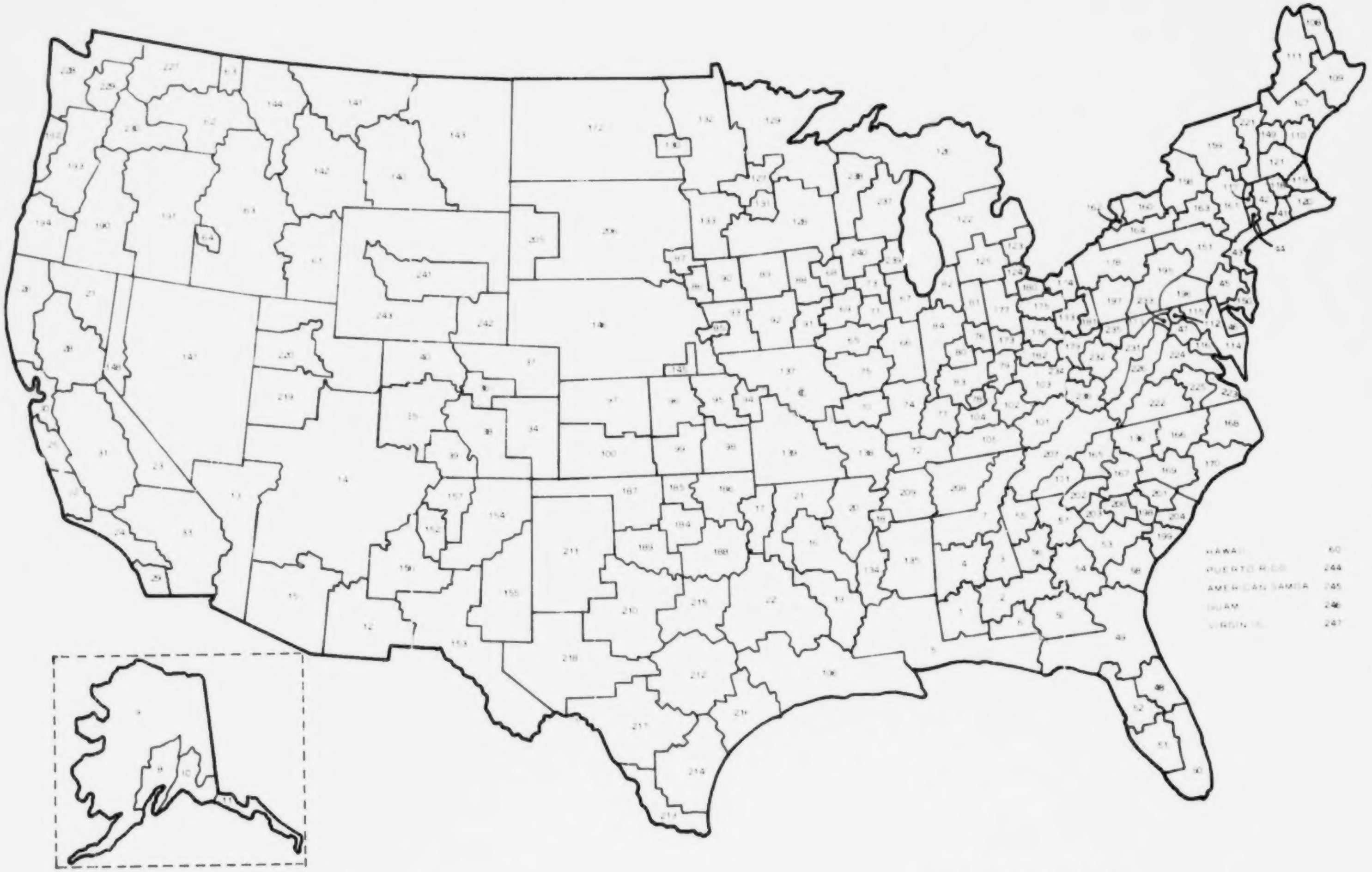
HAWAII 60
PUERTO RICO 244
AMERICAN SAMOA 245
GUAM 246
VIRGIN IS. 247

Figure A-2. Federal Air Quality Control Regions.

A.2 SOURCE CLASSIFICATION CODES

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                         NATIONAL EMISSIONS DATA SYSTEM(NEDS)
                         SOURCE CLASSIFICATION CODE(SCC) REPORT

 SCC ID                  SCC CATEGORY NAMES
 *** **                  *** ******** *****
I II III IV     I                  II               III                IV                   UNITS

1 01 001 01 EXTCOMB BOILER    |ELECTRIC GENERATN|ANTHRACITE COAL   |>100MMBTU PULVIZD   |TONS BURNED
1 01 001 02 EXTCOMB BOILER    |ELECTRIC GENERATN|ANTHRACITE COAL   |>100MMBTU STOKERS   |TONS BURNED
1 01 001 03 EXTCOMB BOILER    |ELECTRIC GENERATN|ANTHRACITE COAL   |10-100MMBTU PULVC   |TONS BURNED
1 01 001 04 EXTCOMB BOILER    |ELECTRIC GENERATN|ANTHRACITE COAL   |10-100MMBTU STOKR   |TONS BURNED
1 01 001 05 EXTCOMB BOILER    |ELECTRIC GENERATN|ANTHRACITE COAL   |<10MMBTU PULVIZED   |TONS BURNED
1 01 001 06 EXTCOMB BOILER    |ELECTRIC GENERATN|ANTHRACITE COAL   |<10MMBTU STOKER     |TONS BURNED
1 01 002 01 EXTCOMB BOILER    |ELECTRIC GENERATN|BITUMINOUS COAL   |>100MMBTU PULVWET   |TONS BURNED
1 01 002 02 EXTCOMB BOILER    |ELECTRIC GENERATN|BITUMINOUS COAL   |>100MMBTU PULVDRY   |TONS BURNED
1 01 002 03 EXTCOMB BOILER    |ELECTRIC GENERATN|BITUMINOUS COAL   |>100MMBTU CYCLONE   |TONS BURNED
1 01 002 04 EXTCOMB BOILER    |ELECTRIC GENERATN|BITUMINOUS COAL   |>100MMBTU SPDSTKR   |TONS BURNED
1 01 002 06 EXTCOMB BOILER    |ELECTRIC GENERATN|BITUMINOUS COAL   |10-100MMBTU PULWT   |TONS BURNED
1 01 002 07 EXTCOMB BOILER    |ELECTRIC GENERATN|BITUMINOUS COAL   |10-100MMBTU PULDY   |TONS BURNED
1 01 002 08 EXTCOMB BOILER    |ELECTRIC GENERATN|BITUMINOUS COAL   |10-100MMBTU OFSTK   |TONS BURNED
1 01 002 09 EXTCOMB BOILER    |ELECTRIC GENERATN|BITUMINOUS COAL   |10-100MMBTU UFSTK   |TONS BURNED
1 01 002 10 EXTCOMB BOILER    |ELECTRIC GENERATN|BITUMINOUS COAL   |<10MMBTU OFSTOKER   |TONS BURNED
1 01 002 11 EXTCOMB BOILER    |ELECTRIC GENERATN|BITUMINOUS COAL   |<10MMBTU UFSTOKER   |TONS BURNED
1 01 002 12 EXTCOMB BOILER    |ELECTRIC GENERATN|BITUMINOUS COAL   |<10MMBTU PULV-DRY   |TONS BURNED
1 01 003 01 EXTCOMB BOILER    |ELECTRIC GENERATN|LIGNITE           |>100MMBTU PULVWET   |TONS BURNED
1 01 003 02 EXTCOMB BOILER    |ELECTRIC GENERATN|LIGNITE           |>100MMBTU PULVDRY   |TONS BURNED
1 01 003 03 EXTCOMB BOILER    |ELECTRIC GENERATN|LIGNITE           |>100MMBTU CYCLONE   |TONS BURNED
1 01 003 04 EXTCOMB BOILER    |ELECTRIC GENERATN|LIGNITE           |>100MMBTU OF STKR   |TONS BURNED
1 01 003 05 EXTCOMB BOILER    |ELECTRIC GENERATN|LIGNITE           |>100MMBTU UF STKR   |TONS BURNED
1 01 003 06 EXTCOMB BOILER    |ELECTRIC GENERATN|LIGNITE           |>100MMBTU SPDSTKR   |TONS BURNED
1 01 003 07 EXTCOMB BOILER    |ELECTRIC GENERATN|LIGNITE           |10-100MMBTU DYPUL   |TONS BURNED
1 01 003 08 EXTCOMB BOILER    |ELECTRIC GENERATN|LIGNITE           |10-100MMBTU WTPUL   |TONS BURNED
1 01 003 09 EXTCOMB BOILER    |ELECTRIC GENERATN|LIGNITE           |10-100MMBTU OFSTK   |TONS BURNED
1 01 003 10 EXTCOMB BOILER    |ELECTRIC GENERATN|LIGNITE           |10-100MMBTO UFSTK   |TONS BURNED
1 01 003 11 EXTCOMB BOILER    |ELECTRIC GENERATN|LIGNITE           |10-100MMBTUSPDSTK   |TONS BURNED
1 01 003 12 EXTCOMB BOILER    |ELECTRIC GENERATN|LIGNITE           |<10MMBTU PULV DRY   |TONS BURNED
1 01 003 13 EXTCOMB BOILER    |ELECTRIC GENERATN|LIGNITE           |<10MMBTU OF STOKR   |TONS BURNED
1 01 003 14 EXTCOMB BOILER    |ELECTRIC GENERATN|LIGNITE           |<10MMBTU UF STOKR   |TONS BURNED
1 01 003 15 EXTCOMB BOILER    |ELECTRIC GENERATN|LIGNITE           |<10MMBTU SPDSTOKR   |TONS BURNED
1 01 004 01 EXTCOMB BOILER    |ELECTRIC GENERATN|RESIDUAL OIL      |>100MMBTU/HR GENL   |1000GALLONS BURNED
1 01 004 02 EXTCOMB BOILER    |ELECTRIC GENERATN|RESIDUAL OIL      |10-100MMBTU/HRGNL   |1000GALLONS BURNED
1 01 004 03 EXTCOMB BOILER    |ELECTRIC GENERATN|RESIDUAL OIL      |<10MMBTU/HR GENL    |1000GALLONS BURNED
1 01 005 01 EXTCOMB BOILER    |ELECTRIC GENERATN|DISTILLATE OIL    |>100MMBTU/HR GENL   |1000GALLONS BURNED
1 01 005 02 EXTCOMB BOILER    |ELECTRIC GENERATN|DISTILLATE OIL    |10-100MMBTU/HRGNL   |1000GALLONS BURNED
1 01 005 03 EXTCOMB BOILER    |ELECTRIC GENERATN|DISTILLATE OIL    |<10MMBTU/HR GENL    |1000GALLONS BURNED
1 01 006 01 EXTCOMB BOILER    |ELECTRIC GENERATN|NATURAL GAS       |>100MMBTU/HR        |MILLION CUBIC FEET BURNED
1 01 006 02 EXTCOMB BOILER    |ELECTRIC GENERATN|NATURAL GAS       |10-100MMBTU/HR      |MILLION CUBIC FEET BURNED
1 01 006 03 EXTCOMB BOILER    |ELECTRIC GENERATN|NATURAL GAS       |<10MMBTU/HR         |MILLION CUBIC FEET BURNED
1 01 007 01 EXTCOMB BOILER    |ELECTRIC GENERATN|PROCESS GAS       |>100MMBTU/HR        |MILLION CUBIC FEET BURNED
1 01 007 02 EXTCOMB BOILER    |ELECTRIC GENERATN|PROCESS GAS       |10-100MMBTU/HR      |MILLION CUBIC FEET BURNED
1 01 007 03 EXTCOMB BOILER    |ELECTRIC GENERATN|PROCESS GAS       |<<10MMBTU/HR        |MILLION CUBIC FEET BURNED
1 01 011 02 EXTCOMB BOILER    |ELECTRIC GENERATN|BAGASSE           |10-100MMBTU/HR      |TONS BURNED
1 01 011 03 EXTCOMB BOILER    |ELECTRIC GENERATN|BAGASSE           |<10MMBTU/HR         |TONS BURNED
1 01 012 01 EXTCOMB BOILER    |ELECTRIC GENERATN|SOLID WASTE/COAL  |>100MMBTU/HR        |TONS BURNED
1 01 012 02 EXTCOMB BOILER    |ELECTRIC GENERATN|SOLID WASTE/COAL  |10-100MMBTU/HR      |TONS BURNED
1 01 012 03 EXTCOMB BOILER    |ELECTRIC GENERATN|SOLID WASTE/COAL  |<10MMBTU/HR         |TONS BURNED
1 02 001 01 EXTCOMB BOILER    |INDUSTRIAL       |ANTHRACITE COAL   |>100MMBTU/HR PULV   |TONS BURNED
1 02 001 02 EXTCOMB BOILER    |INDUSTRIAL       |ANTHRACITE COAL   |>100MMBTU/HR STKR   |TONS BURNED
1 02 001 03 EXTCOMB BOILER    |INDUSTRIAL       |ANTHRACITE COAL   |10-100MMBTU PULVD   |TONS BURNED
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A-20

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                              NATIONAL EMISSIONS DATA SYSTEM(NEDS)
                              SOURCE CLASSIFICATION CODE(SCC) REPORT

  SCC ID                      SCC CATEGORY NAMES
  *** **                      *** ******** *****
I II III IV      I                II                III                 IV                    UNITS

1 02 001 04 EXTCOMB BOILER   |INDUSTRIAL       |ANTHRACITE COAL  |10-100MMBTU STKR    |TONS BURNED
1 02 001 05 EXTCOMB BOILER   |INDUSTRIAL       |ANTHRACITE COAL  |<10MMBTU/HR PULVD   |TONS BURNED
1 02 001 06 EXTCOMB BOILER   |INDUSTRIAL       |ANTHRACITE COAL  |<10MMBTU/HR STKR    |TONS BURNED
1 02 001 07 EXTCOMB BOILER   |INDUSTRIAL       |ANTHRACITE COAL  |<10MMBTU/HR HNDFR   |TONS BURNED
1 02 002 01 EXTCOMB BOILER   |INDUSTRIAL       |BITUMINOUS COAL  |>100MMBTU PULVWET   |TONS BURNED
1 02 002 02 EXTCOMB BOILER   |INDUSTRIAL       |BITUMINOUS COAL  |>100MMBTU PULVDRY   |TONS BURNED
1 02 002 03 EXTCOMB BOILER   |INDUSTRIAL       |BITUMINOUS COAL  |>100MMBTU CYCLONE   |TONS BURNED
1 02 002 04 EXTCOMB BOILER   |INDUSTRIAL       |BITUMINOUS COAL  |>100MMBTU SPDSTKR   |TONS BURNED
1 02 002 05 EXTCOMB BOILER   |INDUSTRIAL       |BITUMINOUS COAL  |10-100MMBTU OFSTK   |TONS BURNED
1 02 002 06 EXTCOMB BOILER   |INDUSTRIAL       |BITUMINOUS COAL  |10-100MMBTU UFSTK   |TONS BURNED
1 02 002 07 EXTCOMB BOILER   |INDUSTRIAL       |BITUMINOUS COAL  |10-100MMBTU PULWT   |TONS BURNED
1 02 002 08 EXTCOMB BOILER   |INDUSTRIAL       |BITUMINOUS COAL  |10-100MMBTU PULDY   |TONS BURNED
1 02 002 09 EXTCOMB BOILER   |INDUSTRIAL       |BITUMINOUS COAL  |10-100MMBTUSPDSTK   |TONS BURNED
1 02 002 10 EXTCOMB BOILER   |INDUSTRIAL       |BITUMINOUS COAL  |<10MMBTU OFD STKR   |TONS BURNED
1 02 002 11 EXTCOMB BOILER   |INDUSTRIAL       |BITUMINOUS COAL  |<10MMBTU UFD STKR   |TONS BURNED
1 02 002 12 EXTCOMB BOILER   |INDUSTRIAL       |BITUMINOUS COAL  |<10MMBTU PULV DRY   |TONS BURNED
1 02 002 13 EXTCOMB BOILER   |INDUSTRIAL       |BITUMINOUS COAL  |<10MMBTU SPD STKR   |TONS BURNED
1 02 002 14 EXTCOMB BOILER   |INDUSTRIAL       |BITUMINOUS COAL  |<10MMBTU HANDFIRE   |TONS BURNED
1 02 003 01 EXTCOMB BOILER   |INDUSTRIAL       |LIGNITE          |>100MMBTU PULVWET   |TONS BURNED
1 02 003 02 EXTCOMB BOILER   |INDUSTRIAL       |LIGNITE          |>100MMBTU PULVDRY   |TONS BURNED
1 02 003 03 EXTCOMB BOILER   |INDUSTRIAL       |LIGNITE          |>100MMBTU CYCLONE   |TONS BURNED
1 02 003 04 EXTCOMB BOILER   |INDUSTRIAL       |LIGNITE          |>100MMBTU OFSTKR    |TONS BURNED
1 02 003 05 EXTCOMB BOILER   |INDUSTRIAL       |LIGNITE          |>100MMBTU UFSTKR    |TONS BURNED
1 02 003 06 EXTCOMB BOILER   |INDUSTRIAL       |LIGNITE          |>100MMBTU SPDSTKR   |TONS BURNED
1 02 003 07 EXTCOMB BOILER   |INDUSTRIAL       |LIGNITE          |10-100MMBTU DYPUL   |TONS BURNED
1 02 003 08 EXTCOMB BOILER   |INDUSTRIAL       |LIGNITE          |10-100MMBTU WTPUL   |TONS BURNED
1 02 003 09 EXTCOMB BOILER   |INDUSTRIAL       |LIGNITE          |10-100MMBTU OFSTK   |TONS BURNED
1 02 003 10 EXTCOMB BOILER   |INDUSTRIAL       |LIGNITE          |10-100MMBTU UFSTK   |TONS BURNED
1 02 003 11 EXTCOMB BOILER   |INDUSTRIAL       |LIGNITE          |10-100MMBTUSPDSTK   |TONS BURNED
1 02 003 12 EXTCOMB BOILER   |INDUSTRIAL       |LIGNITE          |<10MMBTU PULV DRY   |TONS BURNED
1 02 003 13 EXTCOMB BOILER   |INDUSTRIAL       |LIGNITE          |<10MMBTU OFSTOKR    |TONS BURNED
1 02 003 14 EXTCOMB BOILER   |INDUSTRIAL       |LIGNITE          |<10MMBTU UFSTOKR    |TONS BURNED
1 02 003 15 EXTCOMB BOILER   |INDUSTRIAL       |LIGNITE          |<10MMBTU FANDFIRE   |TONS BURNED
1 02 003 16 EXTCOMB BOILER   |INDUSTRIAL       |LIGNITE          |<10MMBTU SPDSTKR    |TONS BURNED
1 02 004 01 EXTCOMB BOILER   |INDUSTRIAL       |RESIDUAL OIL     |>100MMBTU/HR        |1000 GALLONS BURNED
1 02 004 02 EXTCOMB BOILER   |INDUSTRIAL       |RESIDUAL OIL     |10-100MMBTU/HR      |1000 GALLONS BURNED
1 02 004 03 EXTCOMB BOILER   |INDUSTRIAL       |RESIDUAL OIL     |<10MMBTU/HR         |1000 GALLONS BURNED
1 02 005 01 EXTCOMB BOILER   |INDUSTRIAL       |DISTILLATE OIL   |>100MMBTU/HR        |1000 GALLONS BURNED
1 02 005 02 EXTCOMB BOILER   |INDUSTRIAL       |DISTILLATE OIL   |10-100MMBTU/HR      |1000 GALLONS BURNED
1 02 005 03 EXTCOMB BOILER   |INDUSTRIAL       |DISTILLATE OIL   |<10MMBTU/HR         |1000 GALLONS BURNED
1 02 006 01 EXTCOMB BOILER   |INDUSTRIAL       |NATURAL GAS      |>100MMBTU/HR        |MILLION CUBIC FEET BURNED
1 02 006 02 EXTCOMB BOILER   |INDUSTRIAL       |NATURAL GAS      |10-100MMBTU/HR      |MILLION CUBIC FEET BURNED
1 02 006 03 EXTCOMB BOILER   |INDUSTRIAL       |NATURAL GAS      |<10MMBTU/HR         |MILLION CUBIC FEET BURNED
1 02 007 01 EXTCOMB BOILER   |INDUSTRIAL       |PROCESS GAS      |>100MMBTU/HR        |MILLION CUBIC FEET BURNED
1 02 007 02 EXTCOMB BOILER   |INDUSTRIAL       |PROCESS GAS      |10-100MMBTU/HR      |MILLION CUBIC FEET BURNED
1 02 007 03 EXTCOMB BOILER   |INDUSTRIAL       |PROCESS GAS      |<10MMBTU/HR         |MILLION CUBIC FEET BURNED
1 02 008 02 EXTCOMB BOILER   |INDUSTRIAL       |COKE             |10-100MMBTU/HR      |TONS BURNED
1 02 008 03 EXTCOMB BOILER   |INDUSTRIAL       |COKE             |<10MMBTU/HR         |TONS BURNED
1 02 009 02 EXTCOMB BOILER   |INDUSTRIAL       |WOOD             |WOOD WASTE BOILER   |TONS BURNED
1 02 009 03 EXTCOMB BOILER   |INDUSTRIAL       |WOOD             |SMALL HANDFIRE      |TONS BURNED
1 02 010 02 EXTCOMB BOILER   |INDUSTRIAL       |LIQ PETROLEUM GAS|10-100MMBTU/HR      |1000GALLONS BURNED
1 02 010 03 EXTCOMB BOILER   |INDUSTRIAL       |LIQ PETROLEUM GAS|<10MMBTU/HR         |1000GALLONS BURNED
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                         NATIONAL EMISSIONS DATA SYSTEM(NEDS)
                        SOURCE CLASSIFICATION CODE(SCC) REPORT

  SCC ID                         SCC CATEGORY NAMES
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I II III IV      I                     II               III                    IV                   UNITS

1 02 011 02 EXTCOMB BOILER    |INDUSTRIAL        |BAGASSE              |10-100MMBTU/HR       |TONS BURNED
1 02 011 03 EXTCOMB BOILER    |INDUSTRIAL        |BAGASSE              |<10MMBTU/HR          |TONS BURNED
1 03 001 05 EXTCOMB BOILER    |COMMERCL-INSTUTNL|ANTHRACITE COAL      |10-100MMBTU PULWT    |TONS BURNED
1 03 001 06 EXTCOMB BOILER    |COMMERCL-INSTUTNL|ANTHRACITE COAL      |10-100MMBTU PULDY    |TONS BURNED
1 03 001 07 EXTCOMB BOILER    |COMMERCL-INSTUTNL|ANTHRACITE COAL      |10-100MMBTUSPDSTK    |TONS BURNED
1 03 001 08 EXTCOMB BOILER    |COMMERCL-INSTUTNL|ANTHRACITE COAL      |<10MMBTU PULVIZED    |TONS BURNED
1 03 001 09 EXTCOMB BOILER    |COMMERCL-INSTUTNL|ANTHRACITE COAL      |<10MMBTU STOKER      |TONS BURNED
1 03 001 10 EXTCOMB BOILER    |COMMERCL-INSTUTNL|ANTHRACITE COAL      |<10MMBTU SPDSTOKR    |TONS BURNED
1 03 002 05 EXTCOMB BOILER    |COMMERCL-INSTUTNL|BITUMINOUS COAL      |10-100MMBTU PULWT    |TONS BURNED
1 03 002 06 EXTCOMB BOILER    |COMMERCL-INSTUTNL|BITUMINOUS COAL      |10-100MMBTU PULDY    |TONS BURNED
1 03 002 07 EXTCOMB BOILER    |COMMERCL-INSTUTNL|BITUMINOUS COAL      |10-100MMBTU OFSTK    |TONS BURNED
1 03 002 08 EXTCOMB BOILER    |COMMERCL-INSTUTNL|BITUMINOUS COAL      |10-100MMBTU UFSTK    |TONS BURNED
1 03 002 09 EXTCOMB BOILER    |COMMERCL-INSTUTNL|BITUMINOUS COAL      |10-100MMBTUSPDSTK    |TONS BURNED
1 03 002 10 EXTCOMB BOILER    |COMMERCL-INSTUTNL|BITUMINOUS COAL      |<10MMBTU PULV-DRY    |TONS BURNED
1 03 002 11 EXTCOMB BOILER    |COMMERCL-INSTUTNL|BITUMINOUS COAL      |<10MMBTU OFSTOKER    |TONS BURNED
1 03 002 12 EXTCOMB BOILER    |COMMERCL-INSTUTNL|BITUMINOUS COAL      |<10MMBTU UFSTOKER    |TONS BURNED
1 03 002 13 EXTCOMB BOILER    |COMMERCL-INSTUTNL|BITUMINOUS COAL      |<10MMBTU SPDSTOKR    |TONS BURNED
1 03 002 14 EXTCOMB BOILER    |COMMERCL-INSTUTNL|BITUMINOUS COAL      |<10MMBTU HANDFIRE    |TONS BURNED
1 03 003 05 EXTCOMB BOILER    |COMMERCL-INSTUTNL|LIGNITE              |10-100MMBTU PULWT    |TONS BURNED
1 03 003 06 EXTCOMB BOILER    |COMMERCL-INSTUTNL|LIGNITE              |10-100MMBTU PULDY    |TONS BURNED
1 03 003 07 EXTCOMB BOILER    |COMMERCL-INSTUTNL|LIGNITE              |10-100MMBTU OFSTK    |TONS BURNED
1 03 003 08 EXTCOMB BOILER    |COMMERCL-INSTUTNL|LIGNITE              |10-100MMBTU UFSTK    |TONS BURNED
1 03 003 09 EXTCOMB BOILER    |COMMERCL-INSTUTNL|LIGNITE              |10-100MMBTUSPDSTK    |TONS BURNED
1 03 003 10 EXTCOMB BOILER    |COMMERCL-INSTUTNL|LIGNITE              |<10MMBTU PULV-DRY    |TONS BURNED
1 03 003 11 EXTCOMB BOILER    |COMMERCL-INSTUTNL|LIGNITE              |<10MMBTU OFSTOKER    |TONS BURNED
1 03 003 12 EXTCOMB BOILER    |COMMERCL-INSTUTNL|LIGNITE              |<10MMBTU UFSTOKER    |TONS BURNED
1 03 003 13 EXTCOMB BOILER    |COMMERCL-INSTUTNL|LIGNITE              |<10MMBTU SPDSTOKR    |TONS BURNED
1 03 003 14 EXTCOMB BOILER    |COMMERCL-INSTUTNL|LIGNITE              |<10MMBTU HANDFIRE    |TONS BURNED
1 03 004 01 EXTCOMB BOILER    |COMMERCL-INSTUTNL|RESIDUAL OIL         |>100MMBTU/HR         |1000 GALLONS BURNED
1 03 004 02 EXTCOMB BOILER    |COMMERCL-INSTUTNL|RESIDUAL OIL         |10-100MMBTU/HR       |1000 GALLONS BURNED
1 03 004 03 EXTCOMB BOILER    |COMMERCL-INSTUTNL|RESIDUAL OIL         |<10MMBTU/HR          |1000 GALLONS BURNED
1 03 005 01 EXTCOMB BOILER    |COMMERCL-INSTUTNL|DISTILLATE           |>100MMBTU/HR         |1000 GALLONS BURNED
1 03 005 02 EXTCOMB BOILER    |COMMERCL-INSTUTNL|DISTILLATE           |10-100MMBTU/HR       |1000 GALLONS BURNED
1 03 005 03 EXTCOMB BOILER    |COMMERCL-INSTUTNL|DISTILLATE           |<10MMBTU/HR          |1000 GALLONS BURNED
1 03 006 01 EXTCOMB BOILER    |COMMERCL-INSTUTNL|NATURAL GAS          |>100MMBTU/HR         |MILLION CUBIC FEET BURNED
1 03 006 02 EXTCOMB BOILER    |COMMERCL-INSTUTNL|NATURAL GAS          |10-100MMBTU/HR       |MILLION CUBIC FEET BURNED
1 03 006 03 EXTCOMB BOILER    |COMMERCL-INSTUTNL|NATURAL GAS          |<10MMBTU/HR          |MILLION CUBIC FEET BURNED
1 03 009 03 EXTCOMB BOILER    |COMMERCL-INSTUTNL|WOOD                 |<10MMBTU/HR          |TONS BURNED
1 03 010 02 EXTCOMB BOILER    |COMMERCL-INSTUTNL|LIQ PETROLEUM GAS|10-100MMBTU/HR       |1000 GALLONS BURNED
1 03 010 03 EXTCOMB BOILER    |COMMERCL-INSTUTNL|LIQ PETROLEUM GAS|<10MMBTU/HR          |1000 GALLONS BURNED
2 01 001 01 INTERNLCOMBUSTION|ELECTRIC GENERATN|DISTILLATE OIL       |TURBINE              |1000 GALLONS BURNED
2 01 002 01 INTERNLCOMBUSTION|ELECTRIC GENERATN|NATURAL GAS          |TURBINE              |MILLION CUBIC FEET
2 01 003 01 INTERNLCOMBUSTION|ELECTRIC GENERATN|DIESEL               |RECIPROCATING        |THOUSANDS OF GALLONS
2 02 001 01 INTERNLCOMBUSTION|INDUSTRIAL        |DISTILLATE OIL       |TURBINE              |1000 GALLONS BURNED
2 02 001 02 INTERNLCOMBUSTION|INDUSTRIAL        |DISTILLATE OIL       |RECIPROCATING        |1000 GALLONS BURNED
2 02 002 01 INTERNLCOMBUSTION|INDUSTRIAL        |NATURAL GAS          |TURBINE              |MILLION CUBIC FEET
2 02 002 02 INTERNLCOMBUSTION|INDUSTRIAL        |NATURAL GAS          |RECIPROCATING        |MILLION CUBIC FEET
2 02 003 01 INTERNLCOMBUSTION|INDUSTRIAL        |GASOLINE             |RECIPROCATING        |1000 GALLONS BURNED
2 02 004 01 INTERNLCOMBUSTION|INDUSTRIAL        |DIESEL FUEL          |RECIPROCATING        |1000 GALLONS BURNED
2 03 001 01 INTERNLCOMBUSTION|COMMERCL-INSTUTNL|DIESEL               |RECIPROCATING        |THOUSANDS OF GALLONS
2 04 001 01 INTERNLCOMBUSTION|ENGINE TESTING    |AIRCRAFT             |TURBOJET             |THOUSANDS OF GALLON/FUEL
3 01 001 01 INDUSTRIAL PROCES|CHEMICAL MFG      |ADIPIC ACID PROD     |GENERAL-CYCLOHEX     |TONS PRODUCED
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                              NATIONAL EMISSIONS DATA SYSTEM(NEDS)
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 SCC ID
 *** **                         SCC CATEGORY NAMES
                                *** ******** *****
I II III IV      I                    II                III                 IV                  UNITS

3 01 002 01 INDUSTRIAL PROCES|CHEMICAL MFG      |AMMONIA W/METHNTR|PURGE GAS          |TONS PRODUCED
3 01 002 02 INDUSTRIAL PROCES|CHEMICAL MFG      |AMMONIA W/METHNTR|STORAGE/LOADING    |TONS PRODUCED
3 01 003 01 INDUSTRIAL PROCES|CHEMICAL MFG      |AMMONIA W/COABSRB|REGENERATOR EXIT   |TONS PRODUCED
3 01 003 02 INDUSTRIAL PROCES|CHEMICAL MFG      |AMMONIA W/COABSRB|PURGE GAS          |TONS PRODUCED
3 01 003 03 INDUSTRIAL PROCES|CHEMICAL MFG      |AMMONIA W/COABSRB|STORAGE/LOADING    |TONS PRODUCED
3 01 004 01 INDUSTRIAL PROCES|CHEMICAL MFG      |AMMONIUM NITRATE |GENERAL            |TONS PRODUCED
3 01 005 01 INDUSTRIAL PROCES|CHEMICAL MFG      |CARBON BLACK     |CHANNEL PROCESS    |TONS PRODUCED
3 01 005 02 INDUSTRIAL PROCES|CHEMICAL MFG      |CARBON BLACK     |THERMAL PROCESS    |TONS PRODUCED
3 01 005 03 INDUSTRIAL PROCES|CHEMICAL MFG      |CARBON BLACK     |FURNACE PROC GAS   |TONS PRODUCED
3 01 005 04 INDUSTRIAL PROCES|CHEMICAL MFG      |CARBON BLACK     |FURNACE PROC OIL   |TONS PRODUCED
3 01 005 05 INDUSTRIAL PROCES|CHEMICAL MFG      |CARBON BLACK     |FURNACE W/GAS/OIL  |TONS PRODUCED
3 01 006 01 INDUSTRIAL PROCES|CHEMICAL MFG      |CHARCOAL MFG     |PYROL/DISTIL/GENL  |TONS PRODUCED
3 01 007 01 INDUSTRIAL PROCES|CHEMICAL MFG      |CHLORINE         |GENERAL            |TONS PRODUCED
3 01 008 01 INDUSTRIAL PROCES|CHEMICAL MFG      |CHLOR-ALKALI     |LIQUIFTN-DIAPHRGM  |TONS PRODUCED
3 01 008 02 INDUSTRIAL PROCES|CHEMICAL MFG      |CHLOR-ALKALI     |LIQUIFTN-MERC CEL  |100 TONS CHLORINE LIQUEFIED
3 01 008 03 INDUSTRIAL PROCES|CHEMICAL MFG      |CHLOR-ALKALI     |LOADING TNKCARVNT  |100 TONS CHLORINE LIQUEFIED
3 01 008 04 INDUSTRIAL PROCES|CHEMICAL MFG      |CHLOR-ALKALI     |LOADING STGTNKVNT  |100 TONS CHLORINE LIQUEFIED
3 01 008 05 INDUSTRIAL PROCES|CHEMICAL MFG      |CHLOR-ALKALI     |AIR-BLOW MC BRINE  |100 TONS CHLORINE LIQUEFIED
3 01 009 01 INDUSTRIAL PROCES|CHEMICAL MFG      |DETERGENT/SOAP   |GENERAL SPRAYDRY   |TONS PRODUCED
3 01 010 01 INDUSTRIAL PROCES|CHEMICAL MFG      |EXPLOSIVES-TNT   |NITRATION REACTRS  |TONS PRODUCED
3 01 010 02 INDUSTRIAL PROCES|CHEMICAL MFG      |EXPLOSIVES-TNT   |HNO3   CONCTRTRS   |TONS PRODUCED
3 01 010 03 INDUSTRIAL PROCES|CHEMICAL MFG      |EXPLOSIVES-TNT   |H2SO4  REGENERATR  |TONS PRODUCED
3 01 010 04 INDUSTRIAL PROCES|CHEMICAL MFG      |EXPLOSIVES-TNT   |RED WATER INCIN    |TONS PRODUCED
3 01 011 01 INDUSTRIAL PROCES|CHEMICAL MFG      |HYDROCHLORIC ACID|BYPRODUCTW/OSCRUB  |TONS FINAL ACID
3 01 011 02 INDUSTRIAL PROCES|CHEMICAL MFG      |HYDROCHLORIC ACID|BYPRODUCT W/SCRUB  |TONS FINAL ACID
3 01 012 01 INDUSTRIAL PROCES|CHEMICAL MFG      |HYDROFLUORIC ACID|ROTRYKILNW/SCRUBR  |TONS ACID
3 01 012 02 INDUSTRIAL PROCES|CHEMICAL MFG      |HYDROFLUORIC ACID|ROTRYKILNW/OSCRUB  |TONS ACID
3 01 012 03 INDUSTRIAL PROCES|CHEMICAL MFG      |HYDROFLUORIC ACID|GRIND/DRY FLUOSPR  |TONS FLUORSPAR
3 01 013 01 INDUSTRIAL PROCES|CHEMICAL MFG      |NITRIC ACID      |AMMONIAOXIDATNOLD  |TONS PURE ACID PRODUCED
3 01 013 02 INDUSTRIAL PROCES|CHEMICAL MFG      |NITRIC ACID      |AMMONIAOXIDATNNEW  |TONS PURE ACID PRODUCED
3 01 013 03 INDUSTRIAL PROCES|CHEMICAL MFG      |NITRIC ACID      |NITACD CONCTR OLD  |TONS PURE ACID PRODUCED
3 01 013 04 INDUSTRIAL PROCES|CHEMICAL MFG      |NITRIC ACID      |NITACD CONCTR NEW  |TONS PURE ACID PRODUCED
3 01 014 01 INDUSTRIAL PROCES|CHEMICAL MFG      |PAINT MFG        |GENERAL            |TONS PRODUCED
3 01 015 01 INDUSTRIAL PROCES|CHEMICAL MFG      |VARNISH MFG      |BODYING OIL GENL   |TONS PRODUCED
3 01 015 02 INDUSTRIAL PROCES|CHEMICAL MFG      |VARNISH MFG      |OLEORESINOUS GENL  |TONS PRODUCED
3 01 015 03 INDUSTRIAL PROCES|CHEMICAL MFG      |VARNISH MFG      |ALKYD GENERAL      |TONS PRODUCED
3 01 015 05 INDUSTRIAL PROCES|CHEMICAL MFG      |VARNISH MFG      |ACRYLIC GENERAL    |TONS PRODUCED
3 01 016 01 INDUSTRIAL PROCES|CHEMICAL MFG      |PHOS-ACID WETPROC|REACTOR-UNCONTLD   |TONS PHOSPHATE ROCK
3 01 016 02 INDUSTRIAL PROCES|CHEMICAL MFG      |PHOS-ACID WETPROC|GYPSUM POND        |TONS PHOSPHATE ROCK
3 01 016 03 INDUSTRIAL PROCES|CHEMICAL MFG      |PHOS-ACID WETPROC|CONDENSR-UNCONTLD  |TONS PHOSPHATE ROCK
3 01 017 01 INDUSTRIAL PROCES|CHEMICAL MFG      |PHOS-ACID THERMAL|GENERAL            |TONS PHOSPHOROUS BURNED
3 01 018 01 INDUSTRIAL PROCES|CHEMICAL MFG      |PLASTICS-PVC     |GENERAL            |TONS PRODUCED
3 01 018 02 INDUSTRIAL PROCES|CHEMICAL MFG      |PLASTICS-POLYPROP|GENERAL            |TONS PRODUCED
3 01 018 03 INDUSTRIAL PROCES|CHEMICAL MFG      |PLASTICS-CTFER   |GENERAL            |TONS PRODUCED
3 01 019 03 INDUSTRIAL PROCES|CHEMICAL MFG      |PHTHALIC ANHYDRID|UNCONTROLLED-GENL  |TONS PRODUCED
3 01 020 01 INDUSTRIAL PROCES|CHEMICAL MFG      |PRINTING INK     |COOKING-GENERAL    |TONS PRODUCED
3 01 020 02 INDUSTRIAL PROCES|CHEMICAL MFG      |PRINTING INK     |COOKING-OILS       |TONS PRODUCED
3 01 020 03 INDUSTRIAL PROCES|CHEMICAL MFG      |PRINTING INK     |COOKING-OLEORESIN  |TONS PRODUCED
3 01 020 04 INDUSTRIAL PROCES|CHEMICAL MFG      |PRINTING INK     |COOKING-ALKYDS     |TONS PRODUCED
3 01 020 05 INDUSTRIAL PROCES|CHEMICAL MFG      |PRINTING INK     |PIGMENT MIXINGGEN  |TONS PIGMENT
3 01 021 01 INDUSTRIAL PROCES|CHEMICAL MFG      |SODIUM CARBONATE |AMMONIA RECOVERY   |TONS PRODUCED
3 01 021 02 INDUSTRIAL PROCES|CHEMICAL MFG      |SODIUM CARBONATE |HANDLING           |TONS PRODUCED
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                                   NATIONAL EMISSIONS DATA SYSTEM(NEDS)
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SCC ID                          SCC CATEGORY NAMES
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I II III IV       I                    II                  III                IV                    UNITS

3 01 022 01 INDUSTRIAL PROCES|CHEMICAL MFG        |H2SO4 -CHAMBER    |GENERAL              |TONS PURE ACID PRODUCED
3 01 023 01 INDUSTRIAL PROCES|CHEMICAL MFG        |H2SO4-CONTACT     |99.7 CONVERSION      |TONS PURE ACID PRODUCED
3 01 023 04 INDUSTRIAL PROCES|CHEMICAL MFG        |H2SO4-CONTACT     |99.5 CONVERSION      |TONS PURE ACID PRODUCED
3 01 023 06 INDUSTRIAL PROCES|CHEMICAL MFG        |H2SO4-CONTACT     |99.0 CONVERSION      |TONS PURE ACID PRODUCED
3 01 023 08 INDUSTRIAL PROCES|CHEMICAL MFG        |H2SO4-CONTACT     |98.0 CONVERSION      |TONS PURE ACID PRODUCED
3 01 023 10 INDUSTRIAL PROCES|CHEMICAL MFG        |H2SO4-CONTACT     |97.0 CONVERSION      |TONS PURE ACID PRODUCED
3 01 023 12 INDUSTRIAL PROCES|CHEMICAL MFG        |H2SO4-CONTACT     |96.0 CONVERSION      |TONS PURE ACID PRODUCED
3 01 023 14 INDUSTRIAL PROCES|CHEMICAL MFG        |H2SO4-CONTACT     |95.0 CONVERSION      |TONS PURE ACID PRODUCED
3 01 023 16 INDUSTRIAL PROCES|CHEMICAL MFG        |H2SO4-CONTACT     |94.0 CONVERSION      |TONS PURE ACID PRODUCED
3 01 023 18 INDUSTRIAL PROCES|CHEMICAL MFG        |H2SO4-CONTACT     |93.0 CONVERSION      |TONS PURE ACID PRODUCED
3 01 024 01 INDUSTRIAL PROCES|CHEMICAL MFG        |SYNTHETIC FIBERS  |NYLON GENERAL        |TONS FIBER
3 01 024 02 INDUSTRIAL PROCES|CHEMICAL MFG        |SYNTHETIC FIBERS  |DACRON GENERAL       |TONS FIBER
3 01 024 03 INDUSTRIAL PROCES|CHEMICALMFG         |SYNTHETIC FIBERS  |ORLON                |TONS PRODUCT
3 01 025 01 INDUSTRIAL PROCES|CHEMICAL MFG        |SEMISYNTHTICFIBR  |RAYON  GENERAL       |TONS FIBER
3 01 026 01 INDUSTRIAL PROCES|CHEMICAL MFG        |SYNTHETIC RUBBER  |BUTADIENE-GENERAL    |TONS PRODUCT
3 01 026 02 INDUSTRIAL PROCES|CHEMICAL MFG        |SYNTHETIC RUBBER  |METHYLPROPENE-GNL    |TONS PRODUCT
3 01 026 03 INDUSTRIAL PROCES|CHEMICAL MFG        |SYNTHETIC RUBBER  |BUTYNE GENERAL       |TONS PRODUCT
3 01 026 04 INDUSTRIAL PROCES|CHEMICAL MFG        |SYNTHETIC RUBBER  |PENTADIENE-GENRL     |TONS PRODUCT
3 01 026 05 INDUSTRIAL PROCES|CHEMICAL MFG        |SYNTHETIC RUBBER  |DIMETHHEPTNE GENL    |TONS PRODUCT
3 01 026 06 INDUSTRIAL PROCES|CHEMICAL MFG        |SYNTHETIC RUBBER  |PENTANE-GENERAL      |TONS PRODUCT
3 01 026 07 INDUSTRIAL PROCES|CHEMICAL MFG        |SYNTHETIC RUBBER  |ETHANENITRILE-GEN    |TONS PRODUCT
3 01 026 08 INDUSTRIAL PROCES|CHEMICAL MFG        |SYNTHETIC RUBBER  |ACRYLONITRILE-GEN    |TONS PRODUCT
3 01 026 09 INDUSTRIAL PROCES|CHEMICAL MFG        |SYNTHETIC RUBBER  |ACROLEIN-GENERAL     |TONS PRODUCT
3 01 027 01 INDUSTRIAL PROCES|CHEMICAL MFG        |FERTILIZ AMONNITR|PRILTWR-NEUTRLIZR     |TONS PRODUCED
3 01 027 02 INDUSTRIAL PROCES|CHEMICAL MFG        |FERTILIZ AMONNITR|PRILLING TOWER        |TONS PRODUCED
3 01 027 03 INDUSTRIAL PROCES|CHEMICAL MFG        |FERTILIZ AMONNITR|PRILTWR-DRYCOOLRS     |TONS PRODUCED
3 01 027 04 INDUSTRIAL PROCES|CHEMICAL MFG        |FERTILIZ AMONNITR|GRANULAT-NEUTLIZR     |TONS PRODUCED
3 01 027 05 INDUSTRIAL PROCES|CHEMICAL MFG        |FERTILIZ AMONNITR|GRANULATOR            |TONS PRODUCED
3 01 027 06 INDUSTRIAL PROCES|CHEMICAL MFG        |FERTILIZ AMONNITR|GRANULAT-DRYCOOLR     |TONS PRODUCED
3 01 028 01 INDUSTRIAL PROCES|CHEMICAL MFG        |FERTILIZ-NSUPPHOS|GRIND-DRY             |TONS PRODUCED
3 01 028 02 INDUSTRIAL PROCES|CHEMICAL MFG        |FERTILIZ-NSUPPHOS|MAIN STACK            |TONS PRODUCED
3 01 029 01 INDUSTRIAL PROCES|CHEMICAL MFG        |FERTILIZ-TRPSPHOS|RUN OF PILE           |TONS PRODUCED
3 01 029 02 INDUSTRIAL PROCES|CHEMICAL MFG        |FERTILIZ-TRPSPHOS|GRANULAR              |TONS PRODUCED
3 01 030 01 INDUSTRIAL PROCES|CHEMICAL MFG        |FERTILIZ-DIAMPHOS|DRYER-COOLERS         |TONS PRODUCED
3 01 030 02 INDUSTRIAL PROCES|CHEMICAL MFG        |FERTILIZ-DIAMPHOS|AMONIAT-GRANULATE     |TONS PRODUCED
3 01 031 01 INDUSTRIAL PROCES|CHEMICAL MFG        |TEREPTHALIC ACID |HNO3+PARAXYLENGEN     |TONS PRODUCED
3 01 032 01 INDUSTRIAL PROCES|CHEMICAL MFG        |SULFUR (ELEMENTL)|MODIFIED-CLAUS        |TONS PRODUCT
3 01 033 01 INDUSTRIAL PROCES|CHEMICAL MFG        |PESTICIDES       |MALATHION             |GALLONS OF PRODUCT
3 01 034 01 INDUSTRIAL PROCES|CHEMICAL MFG        |AMINE MFG        |GENERAL               |TONS OF PRODUCT
3 01 035 01 INDUSTRIAL PROCES|CHEMICAL MFG        |PIGMENT-INORGAN  |CALCINATION           |TONS OF PRODUCT
3 02 001 01 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|ALFALFA DEHYDRATN|GENERAL               |TONS MEAL PRODUCED
3 02 002 01 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|COFFEE ROASTING  |DIRECTFIRE ROASTR     |TONS GREEN BEANS
3 02 002 02 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|COFFEE ROASTING  |INDIRCTFIRERCASTR     |TONS GREEN BEANS
3 02 002 03 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|COFFEE ROASTING  |STONER/COOLER         |TONS GREEN BEANS
3 02 003 01 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|COFFEE-INSTANT   |SPRAY DRIER           |TONS GREEN BEANS
3 02 004 01 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|COTTON GINNING   |UNLOADING FAN         |BALES COTTON
3 02 004 02 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|COTTON GINNING   |CLEANER               |BALES COTTON
3 02 004 03 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|COTTON GINNING   |STICK/BURR MACHNE     |BALES COTTON
3 02 005 01 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|FEED/GRAIN TERMEL|SHIPING/RECEIVING     |TONS GRAIN PROCESSED
3 02 005 02 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|FEED/GRAIN TERMEL|TRANSFER/CONVEYNG     |TONS GRAIN PROCESSED
3 02 005 03 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|FEED/GRAIN TERMEL|SCREENING/CLEANNG     |TONS GRAIN PROCESSED
3 02 005 04 INDUSTRIAL PROCES|FOOD/AGRICULTURAL|FEED/GRAIN TERMEL|DRYING                |TONS GRAIN PROCESSED
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                                        SOURCE CLASSIFICATION CODE(SCC) REPORT

 SCC  ID                               SCC CATEGORY NAMES
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I II III IV      I                    II                   III                  IV                  UNITS

3 02 006 01 INDUSTRIAL  PROCES|FOOD/AGRICULTURAL|FEED/GRAIN CNTRYE|SHIPNG/RECEIVNG    |TONS GRAIN PROCESSED
3 02 006 02 INDUSTRIAL  PROCES|FOOD/AGRICULTURAL|FEED/GRAIN CNTRYE|TRANSFER/CONVEYNG  |TONS GRAIN PROCESSED
3 02 006 03 INDUSTRIAL  PROCES|FOOD/AGRICULTURAL|FEED/GRAIN CNTRYE|SCREENING/CLEANNG  |TONS GRAIN PROCESSED
3 02 006 04 INDUSTRIAL  PROCES|FOOD/AGRICULTURAL|FEED/GRAIN CNTRYE|DRYING             |TONS GRAIN PROCESSED
3 02 007 01 INDUSTRIAL  PROCES|FOOD/AGRICULTURAL|GRAIN PROCESSING |CORN MEAL          |TONS GRAIN PROCESSED
3 02 007 02 INDUSTRIAL  PROCES|FOOD/AGRICULTURAL|GRAIN PROCESSING |SOY BEAN           |TONS GRAIN PROCESSED
3 02 007 03 INDUSTRIAL  PROCES|FOOD/AGRICULTURAL|GRAIN PROCESSING |BARLEY/WHEATCLEAN  |TONS GRAIN PROCESSED
3 02 007 04 INDUSTRIAL  PROCES|FOOD/AGRICULTURAL|GRAIN PROCESSING |MILO CLEANER       |TONS GRAIN PROCESSED
3 02 007 05 INDUSTRIAL  PROCES|FOOD/AGRICULTURAL|GRAIN PROCESSING |BARLEYFLOUR MILL   |TONS GRAIN PROCESSED
3 02 007 06 INDUSTRIAL  PROCES|FOOD/AGRICULTURAL|GRAIN PROCESSING |WET CORN MILLING   |TONS OF PRODUCT
3 02 008 01 INDUSTRIAL  PROCES|FOOD/AGRICULTURAL|FEED MANUFACTURE |BARLEY FEED-GENL   |TONS GRAIN PROCESSED
3 02 009 01 INDUSTRIAL  PROCES|FOOD/AGRICULTURAL|FERMENTATN-BEER  |GRAIN HANDLING     |TONS GRAIN PROCESSED
3 02 009 02 INDUSTRIAL  PROCES|FOOD/AGRICULTURAL|FERMENTATN-BEER  |DRYING SPNT GRAIN  |TONS GRAIN PROCESSED
3 02 009 03 INDUSTRIAL  PROCES|FOOD/AGRICULTURAL|FERMENTATION-BEER| BREWING           |THOUSANDS OF GALLONS
3 02 010 01 INDUSTRIAL  PROCES|FOOD/AGRICULTURAL|FERMENTATN-WHISKY|GRAIN HANDLING     |TONS GRAIN PROCESSED
3 02 010 02 INDUSTRIAL  PROCES|FOOD/AGRICULTURAL|FERMENTATN-WHISKY|DRYING SPNT GRAIN  |TONS GRAIN PROCESSED
3 02 010 03 INDUSTRIAL  PROCES|FOOD/AGRICULTURAL|FERMENTATN-WHISKY|AGING              |TONS GRAIN PROCESSED
3 02 011 01 INDUSTRIAL  PROCES|FOOD/AGRICULTURAL|FERMENTATN-WINE  |GENERAL            |TONS GRAIN PROCESSED
3 02 012 01 INDUSTRIAL  PROCES|FOOD/AGRICULTURAL|FISH MEAL        |COOKERS-FRESHFISH  |TONS FISH MEAL PRODUCED
3 02 012 02 INDUSTRIAL  PROCES|FOOD/AGRICULTURAL|FISH MEAL        |COOKERS-STALEFISH  |TONS FISH MEAL PRODUCED
3 02 012 03 INDUSTRIAL  PROCES|FOOD/AGRICULTURAL|FISH MEAL        |DRIERS             |TONS FISH SCRAP
3 02 013 01 INDUSTRIAL  PROCES|FOOD/AGRICULTURAL|MEAT SMOKING     |GENERAL            |TONS MEAT SMOKED
3 02 014 01 INDUSTRIAL  PROCES|FOOD/AGRICULTURAL|STARCH MFG       |GENERAL            |TONS STARCH PRODUCED
3 02 015 01 INDUSTRIAL  PROCES|FOOD/AGRICULTURAL|SUGAR CANE PROCES|GENERAL            |TONS SUGAR PRODUCED
3 02 016 01 INDUSTRIAL  PROCES|FOOD/AGRICULTURAL|SUGAR BEET PROCES|DRYER ONLY         |TONS RAW BEETS
3 03 000 01 INDUSTRIAL  PROCES|PRIMARY METALS   |ALUMINUM ORE-BAUX|CRUSHING/HANDLING  |TONS OF ORE
3 03 001 01 INDUSTRIAL  PROCES|PRIMARY METALS   |AL ORE-ELECRDREDN|PREBAKE CELLS      |TONS ALUMINUM PRODUCED
3 03 001 02 INDUSTRIAL  PROCES|PRIMARY METALS   |AL ORE-ELECRDREDN|HORIZSTD SODERBRG  |TONS ALUMINUM PRODUCED
3 03 001 03 INDUSTRIAL  PROCES|PRIMARY METALS   |AL ORE-ELECRDREDN|VERTSTD SODERBERG  |TONS ALUMINUM PRODUCED
3 03 002 01 INDUSTRIAL  PROCES|PRIMARY METALS   |AL ORE-CALC ALHYD|GENERAL            |TONS ALUMINUM PRODUCED
3 03 003 01 INDUSTRIAL  PROCES|PRIMARY METALS   |COKE MET BYPRODUC|TGENERAL           |TONS COAL CHARGED
3 03 004 01 INDUSTRIAL  PROCES|PRIMARY METALS   |COKE MET-BEEHIVE |GENERAL            |TONS COAL CHARGED
3 03 005 01 INDUSTRIAL  PROCES|PRIMARY METALS   |COPPER SMELTER   |TOTAL/GENERAL      |TONS CONCENTRATED ORE
3 03 005 02 INDUSTRIAL  PROCES|PRIMARY METALS   |COPPER SMELTER   |ROASTING           |TONS CONCENTRATED ORE
3 03 005 03 INDUSTRIAL  PROCES|PRIMARY METALS   |COPPER SMELTER   |SMELTING           |TONS CONCENTRATED ORE
3 03 005 04 INDUSTRIAL  PROCES|PRIMARY METALS   |COPPER SMELTER   |CONVERTING         |TONS CONCENTRATED ORE
3 03 005 05 INDUSTRIAL  PROCES|PRIMARY METALS   |COPPER SMELTER   |REFINING           |TONS CONCENTRATED ORE
3 03 005 06 INDUSTRIAL  PROCES|PRIMARY METALS   |COPPER MINE      |ORE DRYER          |TONS OF ORE
3 03 006 01 INDUSTRIAL  PROCES|PRIMARY METALS   |FERALLOY OPEN FNC|50% FESI           |TONS PRODUCED
3 03 006 02 INDUSTRIAL  PROCES|PRIMARY METALS   |FERALLOY OPEN FNC|75% FESI           |TONS PRODUCED
3 03 006 03 INDUSTRIAL  PROCES|PRIMARY METALS   |FERALLOY OPEN FNC|90% FESI           |TONS PRODUCED
3 03 006 04 INDUSTRIAL  PROCES|PRIMARY METALS   |FERALLOY OPEN FNC|SILICON METAL      |TONS PRODUCED
3 03 006 05 INDUSTRIAL  PROCES|PRIMARY METALS   |FERALLOY OPEN FNC|SILICOMANGANESE    |TONS PRODUCED
3 03 007 01 INDUSTRIAL  PROCES|PRIMARY METALS   |FERALOY SEMCOVFNC|FEROMANGANESE      |TONS PRODUCED
3 03 007 02 INDUSTRIAL  PROCES|PRIMARY METALS   |FERALOY COVC FNC |GENERAL            |TONS PRODUCED
3 03 008 01 INDUSTRIAL  PROCES|PRIMARY METALS   |IRON PRODUCTION  |BLAST FNC-ORECHG   |TONS PRODUCED
3 03 008 02 INDUSTRIAL  PROCES|PRIMARY METALS   |IRON PRODUCTION  |BLAST FNC-AGLCHG   |TONS PRODUCED
3 03 008 03 INDUSTRIAL  PROCES|PRIMARY METALS   |IRON PRODUCTION  |SINTERING GENERAL  |TONS PRODUCED
3 03 008 04 INDUSTRIAL  PROCES|PRIMARY METALS   |IRONPRODUCTION   |ORE-CRUSH/HANDLE   |TONS OF ORE
3 03 009 01 INDUSTRIAL  PROCES|PRIMARY METALS   |STEEL PRODUCTION |OPNHEARTH OXLANCE  |TONS PRODUCED
3 03 009 02 INDUSTRIAL  PROCES|PRIMARY METALS   |STEEL PRODUCTION |OPNHEARTH NOXLNCE  |TONS PRODUCED
3 03 009 03 INDUSTRIAL  PROCES|PRIMARY METALS   |STEEL PRODUCTION |BOF-GENERAL        |TONS PRODUCED
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                                   NATIONAL EMISSIONS DATA SYSTEM(NEDS)
                                   SOURCE CLASSIFICATION CODE(SCC) REPORT

  SCC ID                      SCC CATEGORY NAMES
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I II III IV     I                    II                  III                  IV                    UNITS

3 03 009 04 INDUSTRIAL PROCES|PRIMARY METALS     |STEEL PRODUCTION |ELECT ARC W/LANCE   |TONS PRODUCED
3 03 009 05 INDUSTRIAL PROCES|PRIMARY METALS     |STEEL PRODUCTION |ELECT ARC NOLANCE   |TONS PRODUCED
3 03 010 01 INDUSTRIAL PROCES|PRIMARY METALS     |LEAD SMELTERS    |SINTER/CRUSHING     |TONS CONCENTRATED ORE
3 03 010 02 INDUSTRIAL PROCES|PRIMARY METALS     |LEAD SMELTERS    |BLAST FURNACE       |TONS CONCENTRATED ORE
3 03 010 03 INDUSTRIAL PROCES|PRIMARY METALS     |LEAD SMELTERS    |REVERB FURNACE      |TONS CONCENTRATED ORE
3 03 011 01 INDUSTRIAL PROCES|PRIMARY METALS     |MOLYBDNUM MINING |GENERAL             |HUNDREDS OF TONS MINED
3 03 011 02 INDUSTRIAL PROCES|PRIMARY METALS     |MOLYBDNUM MILLING|GENERAL             |TONS PRODUCT
3 03 012 01 INDUSTRIAL PROCES|PRIMARY METALS     |TITANIUM PROCESS |CHLORINATION STAT   |TONS PRODUCT
3 03 013 01 INDUSTRIAL PROCES|PRIMARY METALS     |GOLD             |MINING/PROCESSING   |TONS ORE
3 04 001 01 INDUSTRIAL PROCES|SECONDARY METALS   |ALUMINUM OPERATN |SWEATINGFURNACE     |TONS METAL PRODUCED
3 04 001 02 INDUSTRIAL PROCES|SECONDARY METALS   |ALUMINUM OPERATN |SMELT-CRUCIBLE      |TONS METAL PRODUCED
3 04 001 03 INDUSTRIAL PROCES|SECONDARY METALS   |ALUMINUM OPERATN |SMELT-REVERB FNC    |TONS METAL PRODUCED
3 04 001 04 INDUSTRIAL PROCES|SECONDARY METALS   |ALUMINUM OPERATN |CHLORINATN STATN    |TONS METAL PRODUCED
3 04 002 01 INDUSTRIAL PROCES|SECONDARY METALS   |BRASS/BRONZ MELT |BLAST FNC           |TONS CHARGE
3 04 002 02 INDUSTRIAL PROCES|SECONDARY METALS   |BRASS/BRONZ MELT |CRUCIBLE FNC        |TONS CHARGE
3 04 002 03 INDUSTRIAL PROCES|SECONDARY METALS   |BRASS/BRONZ MELT |CUPOLA FNC          |TONS CHARGE
3 04 002 04 INDUSTRIAL PROCES|SECONDARY METALS   |BRASS/BRONZ MELT |ELECT INDUCTION     |TONS CHARGE
3 04 002 05 INDUSTRIAL PROCES|SECONDARY METALS   |BRASS/BRONZ MELT |REVERB FNC          |TONS CHARGE
3 04 002 06 INDUSTRIAL PROCES|SECONDARY METALS   |BRASS/BRONZ MELT |ROTARY FNC          |TONS CHARGE
3 04 003 01 INDUSTRIAL PROCES|SECONDARY METALS   |GRAY IRON        |CUPOLA              |TONS METAL CHARGE
3 04 003 02 INDUSTRIAL PROCES|SECONDARY METALS   |GRAY IRON        |REVERB FNC          |TONS METAL CHARGE
3 04 003 03 INDUSTRIAL PROCES|SECONDARY METALS   |GRAY IRON        |ELECT INDUCTION     |TONS METAL CHARGE
3 04 004 01 INDUSTRIAL PROCES|SECONDARY METALS   |LEAD SMELT SEC   |POT FURNACE         |TONS PROCESSED
3 04 004 02 INDUSTRIAL PROCES|SECONDARY METALS   |LEAD SMELT SEC   |REVERB FNC          |TONS PROCESSED
3 04 004 03 INDUSTRIAL PROCES|SECONDARY METALS   |LEAD SMELT SEC   |BLAST/CUPOLA FNC    |TONS PROCESSED
3 04 004 04 INDUSTRIAL PROCES|SECONDARY METALS   |LEAD SMELT SEC   |ROTARY REVERB FNC   |TONS PROCESSED
3 04 005 01 INDUSTRIAL PROCES|SECONDARY METALS   |LEAD BATTERY     |GENERAL             |TONS PROCESSED
3 04 006 01 INDUSTRIAL PROCES|SECONDARY METALS   |MAGNESIUM SEC    |POT FURNACE         |TONS PROCESSED
3 04 007 01 INDUSTRIAL PROCES|SECONDARY METALS   |STEEL FOUNDRY    |ELECTRIC ARC FNC    |TONS PROCESSED
3 04 007 02 INDUSTRIAL PROCES|SECONDARY METALS   |STEEL FOUNDRY    |OPEN HEARTH FNC     |TONS PROCESSED
3 04 007 03 INDUSTRIAL PROCES|SECONDARY METALS   |STEEL FOUNDRY    |OPEN HEARTH LANCD   |TONS PROCESSED
3 04 008 01 INDUSTRIAL PROCES|SECONDARY METALS   |ZINC SEC         |RETORT FNC          |TONS PRODUCED
3 04 008 02 INDUSTRIAL PROCES|SECONDARY METALS   |ZINC SEC         |HORIZ MUFFLE FNC    |TONS PRODUCED
3 04 008 03 INDUSTRIAL PROCES|SECONDARY METALS   |ZINC SEC         |POT FURNACE         |TONS PRODUCED
3 04 008 04 INDUSTRIAL PROCES|SECONDARY METALS   |ZINC SEC         |SWEAT FURNACE       |TONS PRODUCED
3 04 008 05 INDUSTRIAL PROCES|SECONDARY METALS   |ZINC SEC         |GALVANIZING KETTL   |TONS PRODUCED
3 04 008 06 INDUSTRIAL PROCES|SECONDARY METALS   |ZINC SEC         |CALCINING KILN      |TONS PRODUCED
3 05 001 01 INDUSTRIAL PROCES|MINERAL PRODUCTS   |ASPHALT ROOFING  |BLOWING OPERATION   |TONS SATURATED FELT PRODUCED
3 05 001 02 INDUSTRIAL PROCES|MINERAL PRODUCTS   |ASPHALT ROOFING  |DIPPING ONLY        |TONS SATURATED FELT PRODUCED
3 05 001 03 INDUSTRIAL PROCES|MINERAL PRODUCTS   |ASPHALT ROOFING  |SPRAYING ONLY       |TONS SATURATED FELT PRODUCED
3 05 001 04 INDUSTRIAL PROCES|MINERAL PRODUCTS   |ASPHALT ROOFING  |DIPPING/SPRAYING    |TONS SATURATED FELT PRODUCED
3 05 002 01 INDUSTRIAL PROCES|MINERAL PRODUCTS   |ASPHALTIC CONCRET|ROTARY DRYER        |TONS PRODUCED
3 05 002 02 INDUSTRIAL PROCES|MINERAL PRODUCTS   |ASPHALTIC CONCRET|OTHER SOURCES       |TONS PRODUCED
3 05 003 01 INDUSTRIAL PROCES|MINERAL PRODUCTS   |BRICK MANUFACTURE|DRYING-RAW MTL      |TONS PRODUCED
3 05 003 02 INDUSTRIAL PROCES|MINERAL PRODUCTS   |BRICK MANUFACTURE|GRINDING-RAW MTL    |TONS PRODUCED
3 05 003 03 INDUSTRIAL PROCES|MINERAL PRODUCTS   |BRICK MANUFACTURE|STORAGE-RAW MTL     |TONS PRODUCED
3 05 003 04 INDUSTRIAL PROCES|MINERAL PRODUCTS   |BRICK MANUFACTURE|CURING GAS FIRED    |TONS PRODUCED
3 05 003 05 INDUSTRIAL PROCES|MINERAL PRODUCTS   |BRICK MANUFACTURE|CURING OIL FIRED    |TONS PRODUCED
3 05 003 06 INDUSTRIAL PROCES|MINERAL PRODUCTS   |BRICK MANUFACTURE|CURING COAL FIRED   |TONS PRODUCED
3 05 004 01 INDUSTRIAL PROCES|MINERAL PRODUCTS   |CALCIUM CARBIDE  |ELECTRIC FNC        |TONS PRODUCED
3 05 004 02 INDUSTRIAL PROCES|MINERAL PRODUCTS   |CALCIUM CARBIDE  |COKE DRYER          |TONS PRODUCED
3 05 004 03 INDUSTRIAL PROCES|MINERAL PRODUCTS   |CALCIUM CARBIDE  |FNC ROOM VENTS      |TONS PRODUCED
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                              NATIONAL EMISSIONS DATA SYSTEM(NEDS)
                              SOURCE CLASSIFICATION CODE(SCC) REPORT

  SCC ID                               SCC CATEGORY NAMES
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I II III IV       I                     II                  III                  IV                    UNITS

3 05 005 01 INDUSTRIAL PROCES|MINERAL PRODUCTS |CASTABLE REFRACTY|RAWMATL DRYER       |TONS FEED MATERIAL
3 05 005 02 INDUSTRIAL PROCES|MINERAL PRODUCTS |CASTABLE REFRACTY|RAWMATL CRUSH/PRC   |TONS FEED MATERIAL
3 05 005 03 INDUSTRIAL PROCES|MINERAL PRODUCTS |CASTABLE REFRACTY|ELECTRIC ARC MELT   |TONS FEED MATERIAL
3 05 005 04 INDUSTRIAL PROCES|MINERAL PRODUCTS |CASTABLE REFRACTY|CURING OVEN         |TONS FEED MATERIAL
3 05 005 05 INDUSTRIAL PROCES|MINERAL PRODUCTS |CASTABLE REFRACTY|MOLD/SHAKEOUT       |TONS FEED MATERIAL
3 05 006 01 INDUSTRIAL PROCES|MINERAL PRODUCTS |CEMENT MFG DRY   |KILNS               |BARRELS CEMENT PRODUCED
3 05 006 02 INDUSTRIAL PROCES|MINERAL PRODUCTS |CEMENT MFG DRY   |DRYERS/GRINDERETC   |BARRELS CEMENT PRODUCED
3 05 007 01 INDUSTRIAL PROCES|MINERAL PRODUCTS |CEMENT MFG WET   |KILNS               |BARRELS CEMENT PRODUCED
3 05 007 02 INDUSTRIAL PROCES|MINERAL PRODUCTS |CEMENT MFG WET   |DRYERS/GRINDERETC   |BARRELS CEMENT PRODUCED
3 05 008 01 INDUSTRIAL PROCES|MINERAL PRODUCTS |CERAMIC/CLAY MFG |DRYING              |TONS INPUT TO PROCESS
3 05 008 02 INDUSTRIAL PROCES|MINERAL PRODUCTS |CERAMIC/CLAY MFG |GRINDING            |TONS INPUT TO PROCESS
3 05 008 03 INDUSTRIAL PROCES|MINERAL PRODUCTS |CERAMIC/CLAY MFG |STORAGE             |TONS INPUT TO PROCESS
3 05 009 01 INDUSTRIAL PROCES|MINERAL PRODUCTS |CLAY/FLYASHSINTER|FLYASH              |TONS FINISHED PRODUCT
3 05 009 02 INDUSTRIAL PROCES|MINERAL PRODUCTS |CLAY/FLYASHSINTER|CLAY/COKE           |TONS FINISHED PRODUCT
3 05 009 03 INDUSTRIAL PROCES|MINERAL PRODUCTS |CLAY/FLYASHSINTER|NATURAL CLAY        |TONS FINISHED PRODUCT
3 05 010 01 INDUSTRIAL PROCES|MINERAL PRODUCTS |COAL CLEANING    |THERM/FLUID BED     |TONS COAL DRIED
3 05 010 02 INDUSTRIAL PROCES|MINERAL PRODUCTS |COAL CLEANING    |THERM/FLASH         |TONS COAL DRIED
3 05 010 03 INDUSTRIAL PROCES|MINERAL PRODUCTS |COAL CLEANING    |THERM/MULTILCUVRD   |TONS COAL DRIED
3 05 011 01 INDUSTRIAL PROCES|MINERAL PRODUCTS |CONCRETE BATCHING|GENERAL             |CUBIC YARDS CONCRETE PRODUCED
3 05 012 01 INDUSTRIAL PROCES|MINERAL PRODUCTS |FIBERGLASS MFG   |REVERBFNC-REGENEX   |TONS MATERIAL PROCESSED
3 05 012 02 INDUSTRIAL PROCES|MINERAL PRODUCTS |FIBERGLASS MFG   |REVERBFNC-RECUPEX   |TONS MATERIAL PROCESSED
3 05 012 03 INDUSTRIAL PROCES|MINERAL PRODUCTS |FIBERGLASS MFG   |ELECTRIC IND FNC    |TONS MATERIAL PROCESSED
3 05 012 04 INDUSTRIAL PROCES|MINERAL PRODUCTS |FIBERGLASS MFG   |FORMING LINE        |TONS MATERIAL PROCESSED
3 05 012 05 INDUSTRIAL PROCES|MINERAL PRODUCTS |FIBERGLASS MFG   |CURING OVEN         |TONS MATERIAL PROCESSED
3 05 013 01 INDUSTRIAL PROCES|MINERAL PRODUCTS |FRIT MFG         |ROTARY FNC GENL     |TONS CHARGE
3 05 014 01 INDUSTRIAL PROCES|MINERAL PRODUCTS |GLASS MFG        |SODA-LIME GENL      |TONS GLASS PRODUCED
3 05 015 01 INDUSTRIAL PROCES|MINERAL PRODUCTS |GYPSUM MFG       |RW MTL DRYER        |TONS THROUGHPUT
3 05 015 02 INDUSTRIAL PROCES|MINERAL PRODUCTS |GYPSUM MFG       |PRIMARY GRINDER     |TONS THROUGHPUT
3 05 015 03 INDUSTRIAL PROCES|MINERAL PRODUCTS |GYPSUM MFG       |CALCINER            |TONS THROUGHPUT
3 05 015 04 INDUSTRIAL PROCES|MINERAL PRODUCTS |GYPSUM MFG       |CONVEYING           |TONS THROUGHPUT
3 05 016 01 INDUSTRIAL PROCES|MINERAL PRODUCTS |LIME MFG         |PRIMARY CRUSHING    |TONS PROCESSED
3 05 016 02 INDUSTRIAL PROCES|MINERAL PRODUCTS |LIME MFG         |SECNDRY CRUSHING    |TONS PROCESSED
3 05 016 03 INDUSTRIAL PROCES|MINERAL PRODUCTS |LIME MFG         |CALCINNG-VERTKILN   |TONS PROCESSED
3 05 016 04 INDUSTRIAL PROCES|MINERAL PRODUCTS |LIME MFG         |CALCINNG-ROTYKILN   |TONS PROCESSED
3 05 017 01 INDUSTRIAL PROCES|MINERAL PRODUCTS |MINERAL WOOL     |CUPOLA              |TONS CHARGE
3 05 017 02 INDUSTRIAL PROCES|MINERAL PRODUCTS |MINERAL WOOL     |REVERB FNC          |TONS CHARGE
3 05 017 03 INDUSTRIAL PROCES|MINERAL PRODUCTS |MINERAL WOOL     |BLOW CHAMBER        |TONS CHARGE
3 05 017 04 INDUSTRIAL PROCES|MINERAL PRODUCTS |MINERAL WOOL     |CURING OVEN         |TONS CHARGE
3 05 017 05 INDUSTRIAL PROCES|MINERAL PRODUCTS |MINERAL WOOL     |COOLER              |TONS CHARGE
3 05 018 01 INDUSTRIAL PROCES|MINERAL PRODUCTS |PERLITE MFG      |VERTICAL FNC GEN    |TONS CHARGE
3 05 019 01 INDUSTRIAL PROCES|MINERAL PRODUCTS |PHOSPHATE ROCK   |DRYING              |TONS PHOSPHATE ROCK
3 05 019 02 INDUSTRIAL PROCES|MINERAL PRODUCTS |PHOSPHATE ROCK   |GRINDING            |TONS PHOSPHATE ROCK
3 05 019 03 INDUSTRIAL PROCES|MINERAL PRODUCTS |PHOSPHATE ROCK   |TRANSFER/STORAGE    |TONS PHOSPHATE ROCK
3 05 019 04 INDUSTRIAL PROCES|MINERAL PRODUCTS |PHOSPHATE ROCK   |OPEN STORAGE        |TONS PHOSPHATE ROCK
3 05 020 01 INDUSTRIAL PROCES|MINERAL PRODUCTS |STONE QUARY/PRCC |PRIMARY CRUSHING    |TONS RAW MATERIAL
3 05 020 02 INDUSTRIAL PROCES|MINERAL PRODUCTS |STONE QUARY/PRCC |SEC CRUSH/SCREEN    |TONS RAW MATERIAL
3 05 020 03 INDUSTRIAL PROCES|MINERAL PRODUCTS |STONE QUARY/PRCC |TERT CRUSH/SCREEN   |TONS RAW MATERIAL
3 05 020 04 INDUSTRIAL PROCES|MINERAL PRODUCTS |STONE QUARY/PRCC |RECRUSH/SCREENING   |TONS RAW MATERIAL
3 05 020 05 INDUSTRIAL PROCES|MINERAL PRODUCTS |STONE QUARY/PRCC |FINES MILL          |TONS RAW MATERIAL
3 05 020 06 INDUSTRIAL PROCES|MINERAL PRODUCTS |STONE QUARY/PRCC |SCREEN/CONVY/HNDL   |TONS PRODUCT
3 05 020 07 INDUSTRIAL PROCES|MINERAL PRODUCTS |STONE QUARY/PRCC |OPEN STORAGE        |TONS PRODUCT STORED
3 05 021 01 INDUSTRIAL PROCES|MINERAL PRODUCTS |SALT MINING      |GENERAL             |TONS MINED
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                                     NATIONAL EMISSIONS DATA SYSTEM(NEDS)
                                   SOURCE CLASSIFICATION CODE(SCC) REPORT

 SCC  ID                       SCC CATEGORY NAMES
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I II III IV       I                 II                  III                  IV                    UNITS

3 05 022 01 INDUSTRIAL PROCES|MINERAL PRODUCTS |POTASH PRODUCTION|MINE-GRIND/DRY      |TONS ORE
3 05 023 01 INDUSTRIAL PROCES|MINERAL PRODUCTS |CALCIUM BORATE   |MINING/PROCESSING   |TONS PRODUCT
3 05 024 01 INDUSTRIAL PROCES|MINERAL PRODUCTS |MG CARBONATE     |MINE/PROCESS        |TONS PRODUCT
3 05 025 01 INDUSTRIAL PROCES|MINERAL PRODUCTS |SAND/GRAVEL      |CRUSHING/SCREENIN   |TONS PRODUCT
3 05 026 01 INDUSTRIAL PROCES|MINERAL PRODUCTS |DIATOMACOUSERTH  |HANDLING            |TONS PRODUCT
3 06 001 01 INDUSTRIAL PROCES|PETROLEUM INDRY  |PROCES HEATER    |OIL                 |1000 BARRELS OIL BURNED
3 06 001 02 INDUSTRIAL PROCES|PETROLEUM INDRY  |PROCES HEATER    |GAS                 |1000 CUBIC FEET GAS BURNED
3 06 002 01 INDUSTRIAL PROCES|PETROLEUM INDRY  |FLUID CRACKERS   |GENERAL (FCC)       |1000 BARRELS FRESH FEED
3 06 003 01 INDUSTRIAL PROCES|PETROLEUM INDRY  |MOV-BED CAT-CRACK|GENERAL (TCC)       |1000 BARRELS FRESH FEED
3 06 004 01 INDUSTRIAL PROCES|PETROLEUM INDRY  |BLOW-DOWN SYSTM  |W/CONTROLS          |1000 BARRELS REFINERY CAPACITY
3 06 004 02 INDUSTRIAL PROCES|PETROLEUM INDRY  |BLOW-DOWN SYSTM  |W/O CONTROLS        |1000 BARRELS REFINERY CAPACITY
3 06 005 01 INDUSTRIAL PROCES|PETROLEUM INDRY  |PROCESS DRAINS   |GEN W/CONTROL       |1000 BARRELS WASTE WATER
3 06 005 02 INDUSTRIAL PROCES|PETROLEUM INDRY  |PROCESS DRAINS   |GEN W/O CONTROL     |1000 BARRELS WASTE WATER
3 06 006 01 INDUSTRIAL PROCES|PETROLEUM INDRY  |VACUUM JETS      |W/CONTROL           |1000 BARRELS VACUUM DISTILLATION
3 06 006 02 INDUSTRIAL PROCES|PETROLEUM INDRY  |VACUUM JETS      |W/O CONTROL         |1000 BARRELS VACUUM DISTILLATION
3 06 007 01 INDUSTRIAL PROCES|PETROLEUM INDRY  |COOLING TOWERS   |                    |MILLION GALLONS COOLING WATER
3 06 008 01 INDUSTRIAL PROCES|PETROLEUM INDRY  |MISCELLANEOUS    |PIPE/VALVE-FLANGE   |1000 BARRELS REFINERY CAPACITY
3 06 008 02 INDUSTRIAL PROCES|PETROLEUM INDRY  |MISCELLANEOUS    |VESL RELIEF VALUE   |1000 BARRELS REFINERY CAPACITY
3 06 008 03 INDUSTRIAL PROCES|PETROLEUM INDRY  |MISCELLANEOUS    |PUMP SEALS          |1000 BARRELS REFINERY CAPACITY
3 06 008 04 INDUSTRIAL PROCES|PETROLEUM INDRY  |MISCELLANEOUS    |COMPRESR SEALS      |1000 BARRELS REFINERY CAPACITY
3 06 008 05 INDUSTRIAL PROCES|PETROLEUM INDRY  |MISCELLANEOUS    |OTHER-GENL          |1000 BARRELS REFINERY CAPACITY
3 06 009 01 INDUSTRIAL PROCES|PETROLEUM INDRY  |FLARES           |NATURAL GAS         |MILLIONS OF CUBIC FEET
3 07 001 01 INDUSTRIAL PROCES|WOOD PRODUCTS    |SULFATE PULPNG   |BLOWTNK ACCUMULTR   |AIR-DRY TONS UNBLEACHED PULP
3 07 001 02 INDUSTRIAL PROCES|WOOD PRODUCTS    |SULFATE PULPNG   |WASHRS/SCREENS      |AIR-DRY TONS UNBLEACHED PULP
3 07 001 03 INDUSTRIAL PROCES|WOOD PRODUCTS    |SULFATE PULPNG   |MULT-EFFECT EVAP    |AIR-DRY TONS UNBLEACHED PULP
3 07 001 04 INDUSTRIAL PROCES|WOOD PRODUCTS    |SULFATE PULPNG   |RECVY BOLR/DCEVAP   |AIR-DRY TONS UNBLEACHED PULP
3 07 001 05 INDUSTRIAL PROCES|WOOD PRODUCTS    |SULFATE PULPNG   |SMELT DISSOLV TNK   |AIR-DRY TONS UNBLEACHED PULP
3 07 001 06 INDUSTRIAL PROCES|WOOD PRODUCTS    |SULFATE PULPNG   |LIME KILNS          |AIR-DRY TONS UNBLEACHED PULP
3 07 001 07 INDUSTRIAL PROCES|WOOD PRODUCTS    |SULFATE PULPNG   |TURPENTINE CONDSR   |AIR-DRY TONS UNBLEACHED PULP
3 07 001 08 INDUSTRIAL PROCES|WOOD PRODUCTS    |SULFATE PULPNG   |FLUIDBED CALCINER   |AIR-DRY TONS UNBLEACHED PULP
3 07 004 01 INDUSTRIAL PROCES|WOOD PRODUCTS    |PULPBOARD MFG    |PAPERBOARD-GEN      |TONS FINISHED PRODUCT
3 07 004 02 INDUSTRIAL PROCES|WOOD PRODUCTS    |PULPBOARD MFG    |FIBERBOARD-GEN      |TONS FINISHED PRODUCT
3 07 005 01 INDUSTRIAL PROCES|WOOD PRODUCTS    |PRESSURE TREATING|CREOSOTE            |TONS OF WOOD TREATED
3 07 006 01 INDUSTRIAL PROCES|WOOD PRODUCTS    |TALLOIL/ROSIN    |GENERAL             |TONS OF PRODUCT
3 09 001 01 INDUSTRIAL PROCES|METAL FABRICATION|IRON/STEEL       |MISC HARDWARE       |TONS OF PRODUCT
3 09 001 02 INDUSTRIAL PROCES|METAL FABRICATION|IRON/STEEL       |FARM MACHINERY      |TONS OF PRODUCT
4 01 001 01 POINT SC EVAP    |CLEANING SOLVENT |DRYCLEANING      |PERCHLORETHYLENE    |TONS CLOTHES CLEANED
4 01 001 02 POINT SC EVAP    |CLEANING SOLVENT |DRYCLEANING      |STODDARD            |TONS CLOTHES CLEANED
4 02 001 01 POINT SC EVAP    |SURFACE COATING  |PAINT            |GENERAL             |TONS COATING
4 02 003 01 POINT SC EVAP    |SURFACE COATING  |VARNISH/SHELLAC  |GENERAL             |TONS COATING
4 02 004 01 POINT SC EVAP    |SURFACE COATING  |LAQUER           |GENERAL             |TONS COATING
4 02 005 01 POINT SC EVAP    |SURFACE COATING  |ENAMEL           |GENERAL             |TONS COATING
4 02 006 01 POINT SC EVAP    |SURFACE COATING  |PRIMER           |GENERAL             |TONS COATING
4 03 001 01 POINT SC EVAP    |PETROLEUM STG    |FIXED ROOF       |BREATHING-PRODUCT   |1000 GALLONS STORAGE CAPACITY
4 03 001 02 POINT SC EVAP    |PETROLEUM STG    |FIXED ROOF       |BREATHING CRUDE     |1000 GALLONS STORAGE CAPACITY
4 03 001 03 POINT SC EVAP    |PETROLEUM STG    |FIXED ROOF       |WORKING-PRODUCT     |1000 GALLONS THROUGHPUT
4 03 001 04 POINT SC EVAP    |PETROLEUM STG    |FIXED ROOF       |WORKING CRUDE       |1000 GALLONS THROUGHPUT
4 03 002 01 POINT SC EVAP    |PETROLEUM STG    |FLOATING ROOF    |BREATHING PRODUCT   |1000 GALLONS STORAGE CAPACITY
4 03 002 02 POINT SC EVAP    |PETROLEUM STG    |FLOATING ROOF    |WORKING-PRODUCT     |1000 GALLONS THROUGHPUT
4 03 002 03 POINT SC EVAP    |PETROLEUM STG    |FLOATING ROOF    |BREATHING-CRUDE     |1000 GALLONS STORAGE CAPACITY
4 03 002 04 POINT SC EVAP    |PETROLEUM STG    |FLOATING ROOF    |WORKING-CRUDE       |1000 GALLONS THROUGHPUT
4 04 001 01 POINT SC EVAP    |GASOLINE MKTNG   |SERV STAT FILL   |SPLASH FILL         |1000 GALLONS THROUGHPUT
```

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                          NATIONAL EMISSIONS DATA SYSTEM(NEDS)
                         SOURCE CLASSIFICATION CODE(SCC) REPORT

 SCC  ID                          SCC CATEGORY NAMES
 ***  **                          *** ********* *****
I II III IV      I                  II                  III                IV                       UNITS

4 04 001 02 POINT SC EVAP      |GASOLINE MKTNG    |SERV STAT FILL    |SUBMERGED FILL          |1000 GALLONS THROUGHPUT
4 04 001 03 POINT SC EVAP      |GASOLINE MKTNG    |SERV STAT FILL    |MIXED FILL SG/SC        |1000 GALLONS THROUGHPUT
4 04 002 01 POINT SC EVAP      |GASOLINE MKTNG    |AUTOMOBILE FILL   |GENERAL                 |1000 GALLONS
4 05 001 01 POINT SC EVAP      |PRINTING PRESS    |DRYERS            |GENERAL                 |TONS SOLVENT
5 01 001 01 SOLID WASTE        |GOVERNMENT        |MUNICIPAL INCIN   |MULTIPLE CHAMBER        |TONS BURNED
5 01 001 02 SOLID WASTE        |GOVERNMENT        |MUNICIPAL INCIN   |SINGLE CHAMBER          |TONS BURNED
5 01 002 01 SOLID WASTE        |GOVERNMENT        |OPEN BURNING DUMP|GENERAL                  |TONS BURNED
5 01 002 02 SOLID WASTE        |GOVERNMENT        |OPEN BURNING DUMP|LANDSCAPE/PRUNING        |TONS BURNED
5 01 002 03 SOLID WASTE        |GOVERNMENT        |OPEN BURNING DUMP|JET FUEL                 |HUNDREDS OF GALLONS
5 02 001 01 SOLID WASTE        |COMM-INST         |INCINERATOR GEN   |MULTIPLE CHAMBER        |TONS BURNED
5 02 001 02 SOLID WASTE        |COMM-INST         |INCINERATOR GEN   |SINGLE CHAMBER          |TONS BURNED
5 02 001 03 SOLID WASTE        |COMM-INST         |INCINERATOR GEN   |CONTROLLED AIR          |TONS BURNED
5 02 001 04 SOLID WASTE        |COMM-INST         |INCINERATOR GEN   |CONICAL REFUSE          |TONS BURNED
5 02 001 05 SOLID WASTE        |COMM-INST         |INCINERATOR GEN   |CONICAL WOOD            |TONS BURNED
5 02 003 01 SOLID WASTE        |COMM-INST         |APARTMENT INCIN   |FLUE FED                |TONS BURNED
5 02 003 02 SOLID WASTE        |COMM-INST         |APARTMENT INCIN   |FLUE FED-MODIFIED       |TONS BURNED
5 02 002 01 SOLID WASTE        |COMM-INST         |OPEN BURNING      |WOOD                    |TONS BURNED
5 03 001 01 SOLID WASTE        |INDUSTRIAL        |INCINERATOR       |MULTIPLE CHAMBER        |TONS BURNED
5 03 001 02 SOLID WASTE        |INDUSTRIAL        |INCINERATOR       |SINGLE CHAMBER          |TONS BURNED
5 03 001 03 SOLID WASTE        |INDUSTRIAL        |INCINERATOR       |CONTROLLED AIR          |TONS BURNED
5 03 001 04 SOLID WASTE        |INDUSTRIAL        |INCINERATOR       |CONICAL REFUSE          |TONS BURNED
5 03 001 05 SOLID WASTE        |INDUSTRIAL        |INCINERATOR       |CONICAL WOOD            |TONS BURNED
5 03 001 06 SOLID WASTE        |INDUSTRIAL        |INCINERATOR       |OPEN PIT                |TONS OF WASTE
5 03 002 01 SOLID WASTE        |INDUSTRIAL        |OPEN BURNING      |WOOD                    |TONS BURNED
5 03 002 02 SOLID WASTE        |INDUSTRIAL        |OPEN BURNING      |REFUSE                  |TONS BURNED
5 03 002 03 SOLID WASTE        |INDUSTRIAL        |OPEN BURNING      |AUTO BODY COMPTS        |TONS BURNED
5 03 003 01 SOLID WASTE        |INDUSTRIAL        |AUTO BODY INCINAT|W/O AFTERBURNER          |AUTOS BURNED
5 03 003 02 SOLID WASTE        |INDUSTRIAL        |AUTO BODY INCINAT|W/ AFTERBURNER           |AUTOS BURNED
5 03 004 01 SOLID WASTE        |INDUSTRIAL        |RAIL CAR BURNING |OPEN                     |CARS BURNED
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A.3 CONTROL EQUIPMENT IDENTIFICATION CODES

Equipment	Code
Wet Scrubber - High Efficiency	001
Wet Scrubber - Medium Efficiency	002
Wet Scrubber - Low Efficiency	003
Gravity Collector - High Efficiency	004
Gravity Collector - Medium Efficiency	005
Gravity Collector - Low Efficiency	006
Centrifugal Collector - High Efficiency	007
Centrifugal Collector - Medium Efficiency	008
Centrifugal Collector - Low Efficiency	009
Electrostatic Precipitator - High Efficiency	010
Electrostatic Precipitator - Medium Efficiency	011
Electrostatic Precipitator - Low Efficiency	012
Gas Scrubber	013
Mist Eliminator - High Velocity	014
Mist Eliminator - Low Velocity	015
Fabric Filter - High Temperature	016
Fabric Filter - Medium Temperature	017
Fabric Filter - Low Temperature	018
Catalytic Afterburner	019
Catalytic Afterburner with Heat Exchanger	020
Direct Flame Afterburner	021
Direct Flame Afterburner with Heat Exchanger	022
Eliminate Coal Combustion	027
Eliminate Coal and Residual Fuel Oil Combustion	028
Change all Fuel Use to Natural Gas	029
No Fuel Use over a maximum sulfur content (specified by the user in the Regional Data Base)	030
Same as Device 030 but with a different allowable Sulfur Content	031
Same as Device 030 but with a different allowable Sulfur Content	032

Equipment	Code
Catalytic Oxidation - Flue gas desulfurization	039
Dry Limestone Injection	041
Wet Limestone Injection	042
Sulfur Plant	045
Process Change	046
No Control Equipment	060

A.4 IPP PROCESS IDENTIFICATION CODES

Process	Code
Kraft Pulp Mills	2621
Combustion	X*0
Digester Blow System	01
Smelt Tank	02
Lime Kiln	03
Recovery Furnace	04
Multiple Effect Evaporator	05
Oxidation Tower	06
Industrial Inorganic Chemicals	2819
Combustion	X0
Sulfur Recovery Incinerator	01
Sulfuric Acid	02
Nitric Acid	03
Amonium Nitrate	04
Hydrofluoricacid	05
Calcium Carbide - Coke Dryer	06
Calcium Carbide - Electric Furnace Hood	07
Calcium Carbide - Electric Furnace Vents	08
Calcium Carbide Stack	09
Calcium Carbide Calcination	10
Phosphoric Acid	11

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* For value of X, see following list for combustion code numbers.

Process	Code	
Inorganic Pigments	2816	
Combustion		X0
Calcination		01
Digestion		02
Chloride Process		03
Chloride Coke or Ore Drying		04
Ore Grinding		05
Titanium Oxide Ore Drying		06
Varnish Reaction Kettles		07
Paints, Varnishes, Lacquers, Enamels, and Allied Products	2851	
Combustion		X0
Varnish Cookers		01
Alkyl Resin		02
Cooking and Blowing		03
Polymerization		04
Petroleum Refining	2911	
Combustion		X0
Fluid Catalytic Units		01
Moving Bed Catalytic Units		02
Sulfur Recovery		03
Acid Refining of Lube Oils		04
Microfines Unit		05
Calciner Kiln		06
Fluid Cooker		07
Process Emission Source		08
Asphalt Batching	2951	
Combustion		X0
Batching		01

Process	Code
Asphalt Batching	
Quarrying	02
Rock Drying	03
Sheet Rock Cutting and Trimming	04
Cement Manufacturing	3241
Combustion	X0
Dry Process	01
Wet Process	02
Sand Dryer	03
Lime Production	3274
Combustion	X0
Rotary Kiln	01
Vertical Kiln	02
Minerals and Earths, Treated	3295
Combustion	X0
Crushing	01
Conveying, Screening, and Shaking	02
Storage Piles	03
Iron and Steel Mills	3312
Combustion	X0
Blast Furnace	01
Basic Oxygen Furnace	02
Sintering	03
Coking Operations	04
Electric Arc Furnace	05
Open Hearth Furnace	06
Bessemer	07
Scarfing	08

Process	Code
Gray Iron Foundaries	3321
Combustion	X0
Cupola	01
Electric Induction	02
Reverberatory Furnace	03
Steel Foundaries	3323
Combustion	X0
Electric Arc	01
Electric Induction	02
Open Hearth	03
Primary Smelting and Refining of Lead	3332
Combustion	X0
Sintering	01
Blast Furnace	02
Reverberatory Furnace	03
Refining of Lead	04
Lead Oxide Manufacturing	05
Secondary Smelting and Refining of Non-Ferrous Metals	3341
Combustion	X0
Aluminum - Chlorination Station	01
Aluminum - Crucible Furnace	02
Aluminum - Reverberatory Furnace	03
Aluminum - Sweating Furnace	04
General Aluminum Operations	05
Brass and Bronze - Crucible Furnace	06
Brass and Bronze - Electric Furnace	07
Brass and Bronze - Reverberatory Furnace	08
Brass and Bronze - Rotary Furnace	09

Process	Code
Non-Ferrous Costings	3369
Combustion	X0
Lead - Cupola	01
Lead Pot Furnace	02
Lead - Reverberatory and Sweating	03
Zinc - Galvanizing Kettles	04
Zinc - Calcine Kilns	05
Zinc - Pot Furnace	06
Zinc - Sweating Furnace	07
Zinc - Distillation Furnace	08
Refuse Systems	4495
Combustion of fuel	X0
Municipal Incinerator	01
Open Burning	02
On-site Multichamber Incinerator	03
On-site Single Multichamber Incinerator	04
Flue Fed Incinerator	05
Other	06
COMBUSTION CODE NUMBERS	
All not listed	00
Pulverized, general	10
Pulverized, dry bottom	20
Pulverized, wet bottom w/o Flyash Reinjection	30
Pulverized, wet bottom with Flyash Reinjection	40
Cyclone	50
Spreader stoker without flyash reinjection	60
Spreader stoker with flyash reinjection	70
All other stokers	80
Hand fired	90

A.5 COMPLIANCE REGULATION IDENTIFICATION CODES

A code for each State's regulations pertaining to compliance schedules is being developed by the MITRE Corporation. This code should be available for distribution by July 1972.

A.6 TRACE ELEMENTS AND COMPOUNDS IDENTIFICATION CODES

Pollutant	Code
Total Element (Free and Combined)	121
Aluminum	12101
Antimony	12102
Arsenic	12103
Argon	12104
Asbestos	12552
Beryllium	12105
Bismuth	12106
Barium	12107
Boron	12108
Bromine	12109
Cadmium	12110
Calcium	12111
Chromium	12112
Cobalt	12113
Copper	12114
Chlorine	12115
Carbon	12116
Cerium	12117
Cesium	12118
Dysprosium	12119
Erbium	12120

Pollutant	Code
Europium	12121
Fluorine	12122
Gadolinium	12123
Gallium	12124
Germanium	12125
Iron	12126
Hafnium	12127
Lead	12128
Holmium	12129
Hydrogen	12130
Indium	12131
Manganese	12132
Iridium	12133
Molybdenum	12134
Krypton	12135
Nickel	12136
Helium	12137
Lithium	12138
Lutetium	12139
Magnesium	12140
Iodine	12141
Mercury	12142
Gold	12143
Neodymium	12144
Neon	12145

Pollutant	Code
Lanthanum	12146
Niobium	12147
Nitrogen	12148
Osmium	12149
Oxygen	12150
Palladium	12151
Phosphorus	12152
Platinum	12153
Selenium	12154
Praseodymium	12155
Protectinium	12156
Radium	12157
Rhenium	12158
Rhodium	12159
Tin	12160
Titanium	12161
Samarium	12162
Scandium	12163
Vanadium	12164
Silicon	12165
Silver	12166
Zinc	12167
Strontium	12168

Pollutant	Code
Sulfur	12169
Tantalum	12170
Tellurium	12171
Terbium	12172
Thallium	12173
Thorium	12174
Thulium	12175
Rubidium	12176
Ruthenium	12177
Tungsten	12178
Uranium	12179
Potassium	12180
Xenon	12181
Ytterbium	12182
Yttrium	12183
Sodium	12184
Zirconium	12185
Group VII Compounds and Ions	122
Bromide ion	12201
Fluoride ion	12202
Chloride ion	12203
Iodide ion	12204
Chlorate ion	12205

Pollutant	Code
Perchlorate ion	12206
Bromate ion	12207
Sodium chloride	12210
Potassium chloride	12211
Calcium chloride	12212
Ammonium chloride	12213
Aluminum chloride	12214
Sodium bromide	12230
Potassium bromide	12231
Sodium iodide	12250
Potassium iodide	12251
Potassium fluoride	12270
Sodium fluoride	12271
Sodium fluorosilicate	12275
Calcium fluorosilicate	12276
Group IV Compounds and Ions	125
Silicate ion	12550
Silicon dioxide	12551
Acids and Bases	126
Total acidity H+	12601
Hydrogen ion concentration pH	12602
Bicarbonate ion	12603
Sulfuric acid	12604
Nitric acid	12605
Hydrochloric acid	12606
Total alkalinity	12650
Hydroxide ion concentration	12651
Carbonate ion	12652
Organo-Metallic Compounds and Ions	127
Miscellaneous	128

APPENDIX B

COMPREHENSIVE EMISSION INVENTORY CARD FORMATS

B.1 POINT SOURCE CARD FORMAT

Plant Identification Data Card

Card Column	Format	Parameter
1 - 2	XX	State Code
3 - 6	XXXX	County Code
7 - 9	XXX	AQCR Code
10 - 13	XXXX	Plant ID Number*
14 - 17	XXXX	City Code
18 - 19	XX	UTM Zone
20 - 21	XX	Year of Record**
22 - 36	A---A	Establishment Name
37 - 61	A---A	Establishment Address
62 - 73	A---A	Contracts (Personal)
74	A	Ownership***
78	X	Action Code
79	P	Point Source Code
80	1	Point Source Card Code

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* This number is unique within county identification

** For each Point Source Card (1, 2, 3, 4, 5 or 6) the Year of Record refers only to the data on that card

*** P = Private
L = Local
S = State government
F = Federal government
U = Utilities

- General Identification and Stack Data Card

Card Column	Format	Parameter	Units
1 - 2	XX	State Code	–
3 - 6	XXXX	County Code	–
7 - 9	XXX	AQCR Code	–
10 - 13	XXXX	Plant ID Number	–
14 - 15	XX	Point ID Number in Plant	–
16 - 17	XX	Year of Record	–
18 - 21	XXXX	SIC Code	–
22 - 23	XX	Process Code (IPP)	–
24 - 27	XXXX.X	UTM Horizontal Coordinate	km
28 - 32	XXXX.X	UTM Vertical Coordinate	km
33 - 36	XXXX	Stack Height	ft
37 - 39	XX.X	Stack Inside Equivalent Diameter, At Top	ft
40 - 43	XXXX	Stack Gas Temperature	°F
44 - 50	XXXXXXX	Stack Gas Flow Rate	Actual ft^3/min
51 - 54	XXXX	Plume Height (if no stack)	ft
78	X	Action Code	–
79	P	Point Source Code	–
80	2	Point Source Card Code	–

Control Equipment Card

Card Column	Format	Parameter	Units
1 - 2	XX	State Code	–
3 - 6	XXXX	County Code	–
7 - 9	XXX	AQCR Code	–
10 - 13	XXXX	Plant ID Number	–
14 - 15	XX	Point ID Number in Plant	–
16 - 17	XX	Year of Record	–

Card Column	Format	Parameter	Units
18 - 22	XXXXX	Total Boiler Design Capacity	10^6 Btu/hr
23 - 25	XXX	Primary Particulate Control Equipment Code	-
26 - 28	XXX	Secondary Particulate Control Equipment Code	-
29 - 31	XXX	Primary SO_2 Control Equipment Code	-
32 - 34	XXX	Secondary SO_2 Control Equipment Code	-
35 - 37	XXX	Primary NO_x Control Equipment Code	-
38 - 40	XXX	Secondary NO_x Control Equipment Code	-
41 - 43	XXX	Primary HC Control Equipment Code	-
44 - 46	XXX	Secondary HC Control Equipment Code	-
47 - 49	XXX	Primary CO Control Equipment Code	-
50 - 52	XXX	Secondary CO Control Equipment Code	-
53 - 55	XX.X	Estimated Control Efficiency-Particulates	%
56 - 58	XX.X	Estimated Control Efficiency-SO_2	%
59 - 61	XX.X	Estimated Control Efficiency-NO_x	%
62 - 64	XX.X	Estimated Control Efficiency-HC	%
65 - 67	XX.X	Estimated Control Efficiency-CO	%
78	X	Action Code	-
79	P	Point Source Code	-
80	3	Point Source Card Code	-

Emission Card

Card Column	Format	Parameter	Units
1 - 2	XX	State Code	–
3 - 6	XXXX	County Code	–
7 - 9	XXX	AQCR Code	–
10 - 13	XXXX	Plant ID Number	–
14 - 15	XX	Point ID Number in Plant	–
16 - 17	XX	Year of Record	–
18 - 19	XX	% of annual thruput (Dec., Jan., Feb.)	– %
20 - 21	XX	% of annual thruput (Mar., Apr., May)	%
22 - 23	XX	% of annual thruput (June, July, Aug.)	%
24 - 25	XX	% of annual thruput (Sept., Oct., Nov.)	%
26 - 27	XX	Normal Operating hr/day	hr
28	X	Normal Operating da/wk	da
29 - 30	XX	Normal Operating wk/yr	wk
31 - 37	XXXXXXX	Emissions Estimate - Particulate	T/yr
38 - 44	XXXXXXX	Emissions Estimate - SO_2	T/yr
45 - 51	XXXXXXX	Emissions Estimate - NO_x	T/yr
52 - 58	XXXXXXX	Emissions Estimate - HC	T/yr
59 - 65	XXXXXXX	Emissions Estimate - CO	T/yr
66	X	Method of estimating Particulate Emissions*	–
67	X	Method of estimating SO_2 Emissions*	–
68	X	Method of estimating NO_x Emissions*	–
69	X	Method of estimating HC Emissions*	–

Card Column	Format	Parameter	Units
70	X	Method of estimating CO Emissions*	–
71 - 73	XX.X	Portion of Fuel used for Space Heating	%
78	X	Action Code	–
79	P	Point Source Code	–
80	4	Point Source Card Code	–

---

* 1 - Stack Tests
2 - Material Balance
3 - Calculated using Emission Factors
4 - Guess

Compliance Analysis Card

Card Column	Format	Parameter	Units
1 - 2	XX	State Code	–
3 - 6	XXXX	County Code	–
7 - 9	XXX	AQCR Code	–
10 - 13	XXXX	Plant ID Number	–
14 - 15	XX	Point ID Number in Plant	–
16 - 17	XX	Year of Record	–
18 - 24	XXXXXXX	Allowable Emissions - Particulate	T/yr
25 - 31	XXXXXXX	Allowable Emissions - SO_2	T/yr
32 - 38	XXXXXX	Allowable Emissions - NO_x	T/yr
39 - 45	XXXXXXX	Allowable Emissions - HC	T/yr
46 - 52	XXXXXXX	Allowable Emissions - CO	T/yr
53	X	Source Compliance Status*	–

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* 1 - In Compliance
2 - Non Compliance, variance not given (complete date items)
3 - Non Compliance, variance given (complete date items)
4 - Compliance status not known

Card Column	Format	Parameter	Units
54 - 55	XX	Year Source must be in compliance (complete only if Compliance Status = 2, 3)	-
56 - 57	XX	Month Source must be in compliance (complete only if Compliance Status = 2, 3)	-
58 - 59	XX	Year of Compliance Status Update	-
60 - 61	XX	Month of Compliance Status Update	-
62 - 63	XX	Day of Compliance Status Update	-
78	X	Action Code	-
79	P	Point Source Code	-
80	5	Point Source Card Code	-

Operating Data Card

Card Column	Format	Parameter	Units
1 - 2	XX	State Code	-
3 - 6	XXXX	County Code	-
7 - 9	XXX	AQCR Code	-
10 - 13	XXXX	Plant ID Number	-
14 - 15	XX	Point ID Number in Plant	-
16 - 17	XX	Year of Record	-
18 - 25	XXXXXXXX	SCC	-
26 - 32	XXXXXXX	Fuel, Process, or Solid Waste Operating Rate	(SCC)*
33 - 39	XXXXXXX	Maximum Design Rate	(SCC)*
40 - 42	X.XX	Sulfur Content	%
43 - 45	XX.X	Ash Content	%
46 - 50	XXXXX	Heat Content	Btu/(SCC)*

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* (SCC): Units defined by SCC category used.

Card Column	Format	Parameter	Units
51 - 70	A----A	Comments	-
71	A	Source**	-
78	X	Action Code	-
79	P	Point Source Code	-
80	6	Point Source Card Code	-

** B = Boiler
P = Industrial Process
S = Solid Waste Disposal

B.2 AREA SOURCE CARD FORMAT

Residential Fuel Card

Card Column	Format	Parameter	Units
1 - 2	XX	State Code	-
3 - 6	XXXX	County Code	-
7 - 9	XXX	AQCR Code	-
10 - 11	XX	Year of Record	-
12 - 16	XXXXX	Emissions Estimate - Particulate	10^2 Tons
17 - 21	XXXXX	Emissions Estimate - SO_2	10^2 Tons
22 - 25	XXXX	Emissions Estimate - NO_x	10^2 Tons
26 - 30	XXXXX	Emissions Estimate - HC	10^2 Tons
31 - 35	XXXXX	Emissions Estimate - CO	10^2 Tons
36 - 37	X.X	Sulfur Content - Anthracite	%
38 - 39	X.X	Sulfur Content - Bituminous	%
40 - 41	X.X	Sulfur Content - Distillate Oil	%
43 - 43	X.X	Sulfur Content - Residual Oil	%
44 - 46	XX.X XX.X	Ash Content - Anthracite	%
47 - 49	XX.X	Ash Content - Bituminous	%
50 - 53	XXXX	Residential Fuel - Anthracite	10^1 Tons

Card Column	Format	Parameter	Units
54 - 58	XXXXX	Residential Fuel - Bituminous	10^1 Tons
59 - 63	XXXXX	Residential Fuel - Distillate	10^4 gal
64 - 68	XXXXX	Residential Fuel - Residential	10^4 gal
69 - 73	XXXXX	Residential Fuel - Natural Gas	$10^7 ft^3$
74 - 77	XXXX	Residential Fuel - Wood	10^1 Tons
78	X	Action Code	-
79	A	Area Card Code	-
80	1	Area Card Code Number	-

Commercial, Institutional, and Industrial Fuel Card

Card Column	Format	Parameter	Units
1 - 2	XX	State Code	-
3 - 6	XXXX	County Code	-
7 - 9	XXX	AQCR Code	-
10 - 14	XXXXX	Commercial and Institutional Fuel - Anthracite	10^1 Tons
15 - 19	XXXXX	Commercial and Institutional Fuel - Bituminous	10^1 Tons
20 - 24	XXXXX	Commercial and Institutional Fuel - Distillate Oil	10^4 gal
25 - 29	XXXXX	Commercial and Institutional Fuel - Residual Oil	10^4 gal
30 - 33	XXXX	Commercial and Institutional Fuel - Natural Gas	10^7 ft^3

Card Column	Format	Parameter	Units
34 - 35	XX	Commercial and Institutional Fuel - Wood	10^2 Tons
36 - 41	XXXXXX	Industrial Fuel - Anthracite	10^1 Tons
42 - 47	XXXXXX	Industrial Fuel - Bituminous	10^1 Tons
48 - 51	XXXX	Industrial Fuel - Coke	10^1 Tons
52 - 56	XXXXX	Industrial Fuel - Distillate Oil	10^4 gal
57 - 61	XXXXX	Industrial Fuel - Residual Oil	10^4 gal
62 - 66	XXXXX	Industrial Fuel - Natural Gas	10^7 ft^3
67 - 69	XXX	Industrial Fuel - Wood	10^2 Tons
70 - 73	XXXX	Industrial Fuel - Process Gas	10^7 ft^3
78	X	Action Code	-
79	A	Area Card Code	-
80	2	Area Card Code Number	-

Waste Disposal and Mobile Fuel Card

Card Column	Format	Parameter	Units
1 - 2	XX	State Code	–
3 - 6	XXXX	County Code	–
7 - 9	XXX	AQCR Code	–
10 - 15	XXXXXX	Residential On-Site Incineration	10^1 Tons
16 - 20	XXXXX	Industrial On-Site Incineration	10^2 Tons
21 - 24	XXXX	Commercial and Institutional On-Site Incineration	10^2 Tons
25 - 30	XXXXXX	Residential Open Burning	10^2 Tons
31 - 36	XXXXXX	Industrial Open Burning	10^2 Tons
37 - 42	XXXXXX	Commercial and Institutional Open Burning	10^2 Tons
43 - 49	XXXXXXX	Gasoline Fuel - Light Vehicle	10^3 gal
50 - 54	XXXXX	Gasoline Fuel - Heavy Vehicle	10^3 gal
55 - 59	XXXXX	Gasoline Fuel - Off Highway	10^3 gal
60 - 64	XXXXX	Diesel Fuel - Heavy Vehicle	10^3 gal
65 - 67	XXX	Diesel Fuel - Off Highway	10^3 gal
68 - 72	XXXXX	Diesel Fuel - Rail Locomotives	10^4 gal
73 - 76	XXXX	County Population	10^3 persons
77	X	Density Code*	–
78	X	Action Code	–
79	A	Area Card Code	–
80	3	Area Card Code Number	–

---

* 1 = Rural
2 = Urban

Mobile Source Card

Card Column	Format	Parameter	Units
1 - 2	XX	State Code	–
3 - 6	XXXX	County Code	–
7 - 9	XXX	AQCR Code	–
10 - 13	XXXX	Military Aircraft	LTO - 10^2 cycles
14 - 18	XXXXX	Civil Aircraft	LTO - 10^1 cycles
19 - 23	XXXXX	Commercial (Air Carrier) Aircraft	LTO - 10^1 cycles
24 - 27	XXXX	Vessel Fuel used in County; Anthracite	10^1 Tons
28 - 31	XXXX	Vessel Fuel used in County; Diesel Oil	10^4 gal
32 - 36	XXXXX	Vessel Fuel used in County; Residual Oil	10^4 gal
37 - 40	XXXX	Vessel Fuel used in County; Gasoline	10^3 gal
41 - 46	XXXXXX	Evaporation - Solvent Purchased/year	Tons
47 - 51	XXXXX	Gasoline Marketed	10^5 gal
52 - 57	XXXXXX	Limited Access Roads, Measured Vehicle Miles	10^4 mi
58 - 63	XXXXXX	Rural Roads, Measured Vehicle Miles	10^4 mi
64 - 69	XXXXXX	Suburban Roads, Measured Vehicle Miles	10^4 mi
70 - 76	XXXXXXX	Urban Roads, Measured Vehicle Miles	10^4 mi
78	X	Action Code	–
79	A	Area Card Code	–
80	4	Area Card Code Number	–

Miscellaneous Source Card

Card Column	Format	Parameter	Units
1 - 2	XX	State Code	-
3 - 6	XXXX	County Code	-
7 - 9	XXX	AQCR Code	-
10 - 16	XXXXXXX	Vehicle Miles Traveled, Dirt Roads	10^3 mi
17 - 21	XXXXX	LTO, Dirt Airstrips	LTO cycles
22 - 26	XXXXX	Land Area Construction	10^3 acres
27 - 31	XXXXX	Rock Handling and Storage	10^3 Tons
32 - 38	XXXXXXX	Forest Fires - Area Burned	acres
39 - 41	XXX	Forest Fires - Quantity/acre	T/acre
42 - 47	XXXXXX	Slash Burning (brush fires-areas burned)	acres
48 - 50	XXX	Slash Burning (brush fires-quantity burned)	T/acre
51 - 54	XXXX	Frost Control, number of orchard heaters	10^2 heaters
55 - 57	XX.X	Number of days heaters fired/year	da/yr
58 - 61	XXXX	Structural Fires	fires/yr
62 - 67	XXXXXX	Coal Refuse Burning - Size of Bank	10^2 yd^3/yr
68 - 70	XXX	Number of Coal Refuse fires burning	fires/yr
78	X	Action Code	-
79	A	Area Card Code	-
80	5	Area Card Code Number	-

Comment Card

Card Column	Format	Parameter
1 - 2	XX	State Code
3 - 6	XXXX	County Code
7 - 9	XXX	AQCR Code
10 - 77	A----A	Comments
78	X	Action Code
79	A	Area Card Code
80	6	Area Card Code Number

B.3 TRACE MATERIALS/HAZARDOUS POLLUTANTS SOURCE CARD FORMAT

Spaces	Format	Symbol	Description	Units
1 - 19	(Same identification codes used on original coding form)			
20 - 21	XX	Numerical	Year of Record	-
22 - 26	XXXXX	Numerical Code	Pollutant	-
27 - 29	XXX	Numerical Code	Primary Control Device	-
30 - 32	XXX	Numerical Code	Secondary Control Device	-
33 - 35	XX.X	Numerical	Collection Efficiency	%
36 - 42	XXXXX.XX	Numerical	Emission Estimate	T/yr
43	X	Numerical Code	Method of Estimating Emissions	-
44	X	Numerical Code	Emissions included in Emission Estimated on Card 4	-
45	X	Numerical Code	Chemical Form of Emissions	-
46 - 52	XXXXX.XX	Numerical	Allowable Emissions	T/yr
53	X	Numerical Code	Compliance Status	-
54 - 57	XXXX	Numerical Code	Compliance Schedule	yr/mo
58 - 63	XXXXXX	Numerical Code	Compliance Status Update	yr/mo/da

B.4 SOURCE CLASSIFICATION CODE CARD FORMAT

Source Classification Code Format

Card Column	Format	Parameter
1	I	SCC - Category I
2 - 3	II	SCC - Category II
4 - 6	III	SCC - Category III
7 - 8	IV	SCC - Category IV
9 - 10		Blank
11 - 27	A----A	Category I Name
28 - 44	A----A	Category II Name
45 - 61	A----A	Category III Name
62 - 78	A----A	Category IV Name
80	1	Card Number

Emission Factors Units Format

Card Column	Format	Parameter
1	X	SCC - Category I
2 - 3	XX	SCC - Category II
4 - 6	XXX	SCC - Category III
7 - 8	XX	SCC - Category IV
9 - 10		Blank
11 - 79	A----A	Source Units Name
80	2	Card Number

Emission Factors Cards Format*

Card Column	Format	Parameter
1	X	SCC - Category I
2 - 3	XX	SCC - Category II
4 - 6	XXX	SCC - Category III
7 - 8	XX	SCC - Category IV
9 - 10		Blank
11 - 19	XXXXXXXXX**	Emission Factor for Particulates
20 - 21	XX	Confidence Level for Particulates
22 - 23		Blank
24 - 32	XXXXXXXXX**	Emission Factor for SO_2
33 - 34	XX	Confidence Level for SO_2
35 - 36		Blank
37 - 45	XXXXXXXXX**	Emission Factor for NO_x
46 - 47	XX	Confidence Level for NO_x
48 - 49		Blank
50 - 58	XXXXXXXXX**	Emission Factor for HC
59 - 60	XX	Confidence Level for HC
61 - 62		Blank
63 - 71	XXXXXXXXX**	Emission Factor for CO
72 - 73	XX	Confidence Level for CO
80	3. . .N	Card Number

---

* There may be more than one card having this format if the number of factor classifications (pollutants) is greater than 5. In this case card number and factor number would increase accordingly.

** One of these positions should be used for a decimal point where necessary.

B.5 GEOGRAPHICAL CARD FORMAT

STATE CARD

Card Column	Format	Parameter
1 - 2	XX	State ID Number
53 - 73	A----A	State Name
80	1	File Number

EPA CARD

Card Column	Format	Parameter
1 - 2	XX	EPA Region ID Number
10 - 34	A----A	EPA Region Name
80	2	File Number

AQCR CARD

Card Column	Format	Parameter
1 - 3	XXX	AQCR ID Number
10 - 64	A----A	AQCR Name
65	X	AQCR Particulate Classification
66	X	AQCR Particulate single point emission significance
67	X	AQCR SO_2 Classification
68	X	AQCR SO_2 single point emission significance
69	X	AQCR NO_x Classification
70	X	AQCR NO_x single point emission significance
71	X	AQCR HC Classification
72	X	AQCR HC single point emission significance
73	X	AQCR CO Classification
74	X	AQCR CO single point emission significance
75	X	AQCR Photo-chemical Classification
76	X	AQCR Photo-chemical single point emission significance
80	3	File Number

COUNTY CARD

Card Column	Format	Parameter
1 - 2	XX	State ID Number
3 - 6	XXXX	County ID Number
7 - 8	XX	EPA Region ID Number
9 - 11	XXX	AQCR ID Number
12 - 16	XXXXX	County Area (mi^2)
53 - 80	A----A	County Name

APPENDIX C
POINT SOURCE DEFINITION

A point source is defined as any emitting point or plant/facility whose summation of emitting points totals 100 tons or more per year of any one of the five primary pollutants: CO, SO_2, NO_x, particulates, or hydrocarbons; or as any of the pollutant sources listed below, regardless of quantity of emissions.

A. Chemical Process Industries

1. Adipic acid
2. Ammonia
3. Ammonium nitrate
4. Carbon black
5. Charcoal
6. Chlorine
7. Detergent and soap
8. Explosives (TNT and nitrocellulose)
9. Hydrofluoric acid
10. Nitric acid
11. Point and varnish manufacturing
12. Phosphoric acid
13. Phthalic anyhdride
14. Plastics manufacturing
15. Printing ink manufacturing
16. Sodium carbonate
17. Sulfuric acid
18. Synthetic fibers
19. Synthetic rubber
20. Terephthalic acid

B. Food and Agricultural Industries
  1. Alfalfa dehydrating
  2. Ammonium nitrate
  3. Coffee roasting
  4. Cotton ginning
  5. Feed and grain
  6. Fermentation processes
  7. Fertilizers
  8. Fish meal processing
  9. Meat smoke houses
  10. Starch manufacturing
  11. Sugar cane processing

C. Metallurgical Industries
  1. Primary metals industries
    a. Aluminum ore reduction
    b. Copper smelters
    c. Ferroalloy production
    d. Iron and steel mills
    e. Lead smelters
    f. Metallurgical coke manufacturing
    g. Zinc
  2. Secondary metals industries
    a. Aluminum operations
    b. Brass and bronze smelting
    c. Ferroalloys
    d. Gray iron foundries
    e. Lead smelting
    f. Magnesium smelting
    g. Steel foundries
    h. Zinc processes

D. Mineral Products Industries

    1. Asphalt roofing
    2. Asphaltic concrete batching
    3. Bricks and related clay refractories
    4. Calcium carbide
    5. Castable refractories
    6. Cement
    7. Ceramic and clay processes
    8. Clay and fly ash sintering
    9. Coal cleaning
    10. Concrete batching
    11. Fiberglass manufacturing
    12. Frit manufacturing
    13. Glass manufacturing
    14. Gypsum manufacturing
    15. Lime manufacturing
    16. Mineral wool manufacturing
    17. Paperboard manufacturing
    18. Perlite manufacturing
    19. Phosphate rock preparation
    20. Rock, gravel, and sand quarrying and processing

E. All Petroleum Refining and Petrochemical Operations

F. All Wood Processing Operations

G. Petroleum Storage (storage tanks and bulk terminals)

H. Miscellaneous

    1. Fossil fuel steam electric powerplants
    2. Municipal or equivalent incinerators
    3. Open burning dumps

I. Hazardous Pollutant Sources

APPENDIX D

EXAMPLE QUESTIONNAIRES

D.1 EXAMPLE COVER LETTER

Dear Sir:

The ________(agency or board)________ requests your cooperation in providing the information asked for on the enclosed questionnaire concerning the operation of your facilities. The data provided will be evaluated and translated into emissions of pollutants to the atmosphere and added to the total emissions from all sources in the __(study area)__. This source information will enable the __(agency or board)__ to develop air pollution control programs necessary for compliance with requirements of the Federal Clean Air Amendments of 1970.

This emission survey is being conducted under provisions of __(cite section of State Law)__. Information from this survey will not be used contrary to the confidentiality provision in __(cite section of State Law)__ or Sec. 114 (c) of the Clean Air Amendments of 1970 concerning the divulgence of methods or processes entitled to protection as trade secrets.

The questionnaire is separated into four sections: fuel combustion, refuse disposal, process losses, and stack data. Each section should be completed regardless of the magnitude or type of material handled, processed, or burned. In completing the questionnaire, give a different number to represent each source in Section I, II, and III and then give stack data opposite the same number or numbers in Section IV. If you require additional information or assistance, you may contact __(name)__ of this office, telephone ____________________.

We would appreciate the return of the questionnaire by __(date)__. Your cooperation and expeditious completion of the inventory forms are urgently requested.

D.2 INSTRUCTIONS FOR COMPLETING QUESTIONNAIRE

A. General Instructions

1. Please return questionnaire by __________.
2. All information is to be based on ______ data; if this is not possible, specify the base year used.
3. Complete all sections of the form that pertain to your firm.
4. The small letters in each column refer to the footnotes at the bottom of the page. Please utilize these in answering each section.

5. If emission rates are available from measurements or computations, they should be included in the appropriate columns, along with supporting data. If emission data are unavailable, the emission column may be left blank. In such case, emissions will be calculated by the staff based upon data supplied. Calculations and factors utilized in determining final emissions will be forwarded to the originator of each questionnaire upon request.

6. If there is more than one plant location, please indicate totals for each location.

7. If additional questionnaires are needed they can be obtained at the following location:

   ____

   ____

8. If you have any questions, please contact __________ at Area Code __________.

B. Specific Instructions

Section I - Fuel Use

1. This section refers to the total amount of fuel consumed on the premises. List the quantities of fuel consumed as designated by footnotes. If there is more than one plant location, list fuel consumption for each location.

2. When estimating the percentage of fuel consumed for process heat, include power generation in the category.

3. Column E should be completed regardless of the type or quantity of fuels consumed.

Section II - Refuse Disposal

1. This section refers to the total quantity of refuse generated on the premises. Please estimate the amount of refuse produced regardless of the method of disposal (Column B).

2. If off-site disposal is used, please indicate name of hauler and location of disposal site.

Section III - Process Emissions

1. This section refers to the quantity of material processed or used to produce the items manufactured by your establishment and includes emissions from liquid storage facilities.

2. Please indicate in Columns A, B, and C, the types of processes, the types of materials used in these processes, and the amounts of these materials

utilized on an annual basis; for example, the amounts of limestone, sand, coal, and blast furnace dust used to produce cement.

3. Any process descriptions, equipment types, flow charts, etc. that will assist in calculating process losses should be included.

4. In Column E, list total flow rate for stacks and vapor losses for storage facilities.

Section IV - Stack Data

1. This section refers to any stacks which vent emissions from any source listed in Sections I through III above.

2. Please list all stacks on the premises and identify which sources are vented from the stack in the column titled "Sources Vented."

3. If test values are not available, please show design, calculated, or estimated values and indicate as such.

Additional Information

In addition to the information requested in Sections I and III, please write the following information on the back side of the questionnaire.

1. Fuel Use
   - a. Average fuel use in gallons or cubic feet per hour
   - b. Maximum fuel use in gallons or cubic feet per hour
2. Material Process Rate
   - a. Average material process rate in pounds, tons, or gallons per hour
   - b. Maximum material process rate in pounds, tons, or gallons per hour

Return To:

D.3 AIR POLLUTANT EMISSIONS SURVEY

Information is to be representative of Calendar Year

FOR OFFICE USE ONLY
Received By:
Reviewed By:
County:
SIC Number:
Coordinates:

Firm name:
Person to contact regarding this report: Title: Phone:
Mailing address:
Plant address:
Nature of business: (Products)
Employees at plant location: If seasonal, give range . Approximate land area at plant location:

SECTION 1 – FUEL USE FOR GENERATION OF HEAT, STEAM, AND POWER

Normal operating schedule. Hours per day Days per week Weeks per year
Seasonal and/or peak operation period: (Specify)
Estimate of percent of total fuel consumed to provide space heat:

	A	B	C	D	E	F	G	H	I	J	K	L
				Fuel data (D)					Air cleaning equipment		Estimate of contaminants (M)	
Source No.	Size of unit(input)(B) 10^6 Btu/hr	Type unit (C)	Installation Date	Type fuel (E)	Amount per year (F)	Heat content (G) Btu	Percent sulfur (G-H)	Percent ash (coal only) (G-H)	Type (I)	Efficiency (J) %	Type (K)	Quantity (L)

SECTION II – REFUSE DISPOSAL

Refuse disposed of On site Off site – Location of disposal site and/or name of hauler
Normal on-site combustion operating schedule: Hours per day Days per week Weeks per year
Seasonal and/or peak operation period: (Specify)

	A	B	C	D	E	F	G	H
	Waste material						Estimate of contaminants (M)	
Source No.(A)	Type (N)	Amount per year (F)	Method of disposal (See Code Page 2)	Incinerator capacity, lb/hr	Auxiliary fuel used (O)	Type and efficiency, air cleaning equipment (I-J)	Type (K)	Quantity per year (L)

L - F

USE ADDITIONAL SHEETS IF NECESSARY

SECTION III – PROCESS EMISSIONS

Normal operating schedule ______________ Hours per day ______________ Days per week ______________ Weeks per year ______________

Seasonal and or peak operation period ______________

NOTE For intermittent operations, indicate approximate frequency and duration so that estimates of yearly emissions may be obtained.

	A	B	C	D	E	F	G	H	I
Source No.(A)	Processes or operations releasing contaminants to atmosphere (A - P)	Installation Date	Materials processed and/or used at operations		Quantity of gas discharged from process or operation	Type and efficiency air cleaning equipment (I - J)	Estimate of contaminants (M)		Basis of estimate (R) (Please specify basis)
			Type (Q)	Quantity per year (F)			Type (K)	Quantity per year (L)	

[a] Give a different no. to represent each source and then give stack data opposite the same number on Section IV.
[b] Nameplate data are sufficient.
[c] Hand-fired, underfeed, traveling-grate or spreader stoker, cyclone furnace; pulverized, wet or dry bottom with or without fly ash reinjection; rotary or gun-type oil burner, etc.
[d] Fuel data are to be reported on "as burned basis."
[e] Coke, bituminous coal, anthracite coal, No. 1, 2, 4, 5 or 6 fuel oil; natural gas; LPG; refinery or coke oven gas; wood, etc.
[f] Pounds, tons, or gallons per year.
[g] If unknown, please give name and address of fuel supplier.
[h] Sulfur and ash content for each fuel should be a weighted average.
[i] Cyclone, scrubber, electrostatic precipitator, baghouse, settling chamber, etc.
[j] Please state if efficiency is a rated or operating efficiency.
[k] Fly ash, sulfur oxides, etc. (include chemical description).
[l] Pounds or tons per year.
[m] Give stack test data if available, or otherwise specify basis used.
[n] Rubbish, garbage, mixed garbage and rubbish, waste paper, wood chips or sawdust, etc.
[o] Indicate whether auxiliary fuel is used in incinerators and pit burning, and the amount.
[p] Sulfuric acid-chamber, aluminum smelting-crucible furnace, iron melting-cupola, cement manufacture-dry process, solvent cleaning, or other (please specify).
[q] Acid produced, tons, metal charged or processed, tons, cement produced, bbl., solvent consumed, gallons, etc. per year.
[r] Process material balance studies, field tests by plant or by equipment manufacturers, or other basis.
[s] List sources Sections I, II, III which utilize each stack.

METHOD OF DISPOSAL CODE:
1. Open burning dump.
2. Sanitary landfill. (no burning)
3. Burned in boiler or furnace.
4. Incinerator, single chamber.
5. Incinerator, multiple chamber
6. Incinerator, rotary.
7. Conical metal burner.
8. Other (Specify)

SECTION IV – STACK DATA

SOURCES VENTED (S)	HEIGHT (Feet)	INSIDE DIAMETER (Feet)	EXIT GAS		
			Temperature of	Velocity (FPS)	Moisture (%)

Any supplemental material or data considered pertinent (flow diagrams, reports, summaries, test results, maps) should be submitted with this form.

Date ______________ Name and title of official submitting reports ______________

PAGE 2

USE ADDITIONAL SHEETS IF NECESSARY

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D.4 CRUDE OIL DRILLING, NATURAL GAS, AND LPG FACILITIES

DATA FOR YEAR ______

Return to:

OFFICE USE ONLY

Rec'd by: ____________

Reviewed by: ____________

County: ____________

Coordinates: ____________

SIC No.: ____________

I. General Information

A. Company Name ____________

Plant Address ____________ City ____________ State ______

Mailing Address ____________ City ____________ State ______

B. Person to contact about this form ____________

Telephone ____________ Position ____________

C. Operating Schedule: other than continuous operation, please specify

____

II. Process Information

A. Drilling Operations: Type of well (natural gas or crude) ____________

Quantity pumped (bbl, gal, cu. ft. per yr.) ____________

Oil ____________ Water ____________

Casing-head gasoline ____________ Sulfur content of crude ____________

Amount Flared ____________ H_2S Content ____________

Sump Loss ____________ (bbls, gal per yr.)

B. Crude Handling and Storage

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Amount transferred to storage ____________ (bbl, gal per yr.)

Type storage tanks (floating or fixed roof) ____________

No. of Tanks ________ Height ______ (ft.) Diameter ____________ (ft.)

Sump Loss ____________ (bbl/yr.)

C. Natural Gas Operations and LPG Plants

Cu. ft. processed/yr. (compressed, absorbed, etc.) specify processes

____

[illegible] ____________ In Gas Engines ____________

Boiler Capacity (BTU/Hr) ____________ Stack Height (ft.) ____________

Dia. (ft.) ____________ Exit Vel. ________ (ft./sec) Exit Temp. ________ °F

NOTE: Fill out separate questionnaires for each location

D.5 CONCRETE BATCH PLANTS

DATA FOR YEAR______

Return to:

OFFICE USE ONLY
Rec'd by:______________________
Reviewed by:____________________
County:________________________
Coordinates__________ ________
SIC No.:_______________________

I. General

A. Company Name____

Plant Address____

City______________________________ Zip Code______________

B. Person to Contact

Name____

Position____

Telephone No.______________________

C. Average Number of Employees______________________________

D. Operating Schedule

______________________Hrs/Day (if seasonal, give range)

______________________Days/Year

II.. Process Information

A. Amount Produced During Year____________(tons) or____________(cubic yards)

B. Control Equipment

Type______________________________

Efficiency________________________%

Installation Date__________________

D.6 CONICAL BURNERS

DATA FOR YEAR______

OFFICE USE ONLY
Rec'd by:______
Reviewed by:______
County:______
Coordinates:______ ______
SIC No.:______

Return to:

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I. General

A. Name______

Burner Location______

City______ Zip Code______

B. Person to Contact

Name______

Position______ Telephone No.______

C. Operating Schedule

______ Hrs/Day (if seasonal, give range)

______ Days/Year

II. Process Information

A. Burner Data

Base Diameter______ Top Diameter______

Height______ Top Screen Size______

B. Firing Data

Percent Excess Air______ Exit Gas Temp.______

Type Overfire:______ (Tangential or Radial)

Method Charge:______ (Bulldozer, conveyor or other)

C. Waste Information

Type	Amount (Tons/Year)
Municipal Refuse	______
Sawdust	______
Planer Shaving	______
Bark	______
Other (please specify)	______

III. Control Equipment

Type______ Percent Efficiency______ Installation Date______

D.7 SAWMILLS

OFFICE USE ONLY

Rec'd by:__________
Reviewed by:__________
County:__________
Coordinates:______ ______
SIC No.:__________

DATA FOR YEAR______

Return to:

I. General

A. Name of Company____________________

Plant Address____________________

City__________ State__________ Zip________

B. Person to Contact____________ Position__________

Telephone No.____________

C. Operating Schedule__________ Hrs/Day__________ Days/Yr

II. Process Information

A. Dust Producing Operations

1. Amount/Year (Tons) processed in each step:

Debarking __________

Cutting __________

Planing __________

Other __________

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2. Is a burner used at this site? Yes ☐ No ☐

If yes, give amount burned/year (Tons)________, and:

a. Date of Installation____________

b. Burner Data: Base Dia. (ft.)________ Top Dia. (ft.)________

Height (ft.)________ Top Screen Size________ Capacity______

c. Firing Data: % Excess Air________ Exit Gas Temp °F________

Type Overfire - tangential or radial

Method of Charge - Bulldozer, conveyor, or other

d. Control Equipment: Type____________________

Per Cent Efficiency % Date of Installation

D.8 PEANUT PROCESSING

Return t

DATA FOR YE R____

OFFICE USE ONLY
Rec'd by:____
Reviewed by:____
County:____
Coordinates:____ ____
SIC No.:____

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I. Genc

A. any Name____

t Address____City____Zip____

B. on to Contact____Position____Telephone No.____

C. age Number of Employees____

D. ating Schedule____Hrs/Day____Days/Year

II. Proc Information

A. Use: Type____ mount____

Control Equipment____Efficiency____%

B. ess

ype of Process	Amount Processed (Tons)	Control Equipment	% Control	Installation Date
ter, direct-fired				
ter, indirect-fired				
lling				
ching				
r				

D.9 COTTON GINNING

DATA FOR YEAR ______

OFFICE USE ONLY

Rec'd by: ____________________

Reviewed by: ____________________

County: ____________________

Coordinates: ________ ________

SIC No.: ____________________

Return to:

I. General

A. Company Name ____

Plant Address ____

City ____________________ Zip Code ____________

B. Person to Contact

Name ____

Position ____

Telephone No. ____________________

C. Average Number of Employees ____________________

D. Operating Schedule

____________________ Months of Operation (Jan., Feb., etc.)

____________________ Hrs/Day

____________________ Days/Year

II. Process Information

A. Bales of Cotton Ginned During Year __________ (500 lb. bales)

B. Gin Trash Disposal

Open Burning ________ (tons)

Land Fill ________ (tons)

Composted ________ (tons)

Hauled Off ________ (tons)

Other ________ ________ (tons)

Reproduced from best available copy.

C. Control Equipment

Type ____________________

Efficiency ____________________ %

Installation Date ____________________

D.10 ASPHALT BATCH PLANTS

DATA FOR YEAR________

OFFICE USE ONLY

Return to:

Rec'd by:____________________
Reviewed by:__________________
County:______________________
Coordinates:________ ________
SIC No.:_____________________

I. General

A. Company Name____

Plant Address____

City______________________ Zip Code____________

B. Person to Contact

Name____

Position______________________ Telephone No._______________

C. Average Number of Employees____________________________

__________________Hrs/Day (if seasonal, give range)

__________________Days/Year

II. Process Information

A. Amount of Asphalt Produced During Year____________(Tons)

B. Control Equipment on Dryer

Equipment Type	% Efficiency	Installation Date
Precleaner		
Cyclone		
Scrubber		
Centrifugal		
Orifice Type		
Baffle Spray Tower		
Bag House		
Other		

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C. Fuel Use

Type____________________________ Amount_________________

D.11 GRAIN HANDLING

OFFICE USE ONLY

Return to:

DATE FOR YEAR________

Rec'd by:________________
Reviewed by:______________
County:__________________
Coordinates:_____ ______

I. General

A. Company Name____
Plant Address____
City_______________________________ Zip Code__________________

B. Person to Contact
Name____
Position____
Telephone No.______________________

C. Average Number of Employees_____________________________________

D. Operating Schedule
______________________Hrs/Day (if seasonal, give range)
______________________Days/Year

II. Process Information

	Tons/Year
A. Terminal Elevators	
1. Shipping or Receiving	____________
2. Transferring, Conveying, etc.	____________
3. Screening and Cleaning	____________
4. Drying	____________

	Tons/Year
B. Country Elevators	
1. Shipping or Receiving	____________
2. Transferring, Conveying, etc.	____________
3. Screening and Cleaning	____________

	Tons/Year
C. Grain Processing	
1. Alfalfa Dehydrating	____________
2. Alfalfa Meal Milling	____________
3. Corn Meal	____________
4. Soybean Processing	____________
5. Malted Barley or Wheat Cleaner	____________
6. *Milo Cleaner or Rice Dryer	____________
7. *Barley Flour or Rice Milling	____________
8. Wheat Milling	____________
D. *Feed Manufacturing	____________

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E. Control Equipment
1. Type of Dust Collector(s) (Specify separately for each process with emissions) ________________
2. Design Efficiency ________________
3. Quantity Retained in collector (s), Tons/Year________________

*Specify which

D.12 PETROLEUM REFINING

Return to:

DATA FOR YEAR________

OFFICE USE ONLY

Rec'd by:________

Reviewed by:________

County:________

Coordinates:________

SIC No.:________

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I. General Information

Firm Name________

Person to Contact________Title________Telephone________

Address of Plant________City________

Mailing Address________City________Zip________

Amount of Crude Processed________Barrels/Year. Plant Capacity________Barrels/Day.

Employees at Plant Site________. Land Area at Site________.

Normal Operating Schedule________Hours/Day________Days/Year.

Type of Sulfur Recovery System________. Amount Removed________. Method of Disposal________.

II. Fuel Use for Generation of Heat, Power, Steam

A	B	C	D	E	F	G	H	Stack Data		
Source Number	Size Unit (input) 10^6 BTU/Hr	Instal-lation Date	Type Fuel	Amount Per/Year	Heat Content	Percent Sulfur	Height Ft.	Dia Ft.	Exit Velocity fps	Exit Temp °F

III. (a) Process Information

Number	Process or Operation Releasing Contaminants To Atmosphere	Materials Processed and/or Used at Operation		Control Equipment		
		Type	Quantity/Year	Type	Instal. Date	Efficiency
101	Catalytic Cracking Unit Type ________	Fresh Feed	________ Barrels			
102	Colling Towers	Colling Water	________ 10^6 Gals			
103	Vacuum Jets	Vacuum Feed	________ Barrels			
104	Process Drains	Waste Water	________ Barrels			
105	Compressor Int. Comb. Engines	______ Gas	________ 1000 $Ft.^3$			
106	Blowdown Systems	Emissions Will be Estimated from Plant Capacity				
107	Storage Tank Number Fixed Roof______ Number Floating Roof______	 ______ 10^3 Gal ______ 10^3 Gal	Total Capacity ________ 10^3 Gal ________ 10^3 Gal			

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IV. (a) Emission and Stack Information for above Processes

	Check Type				Stack Data				Emission Estimates (Tons/Year) to Atmosphere						
Source No. of Process Above	Stack	Flare	Tank Farm	Fugitive Loss	Height (Ft.)	Dia. (Ft.)	Exit Velocity (fps)	Exit Temp °F	Particulates	Sulfur Oxides	Carbon Monoxide	Hydrocarbon	Nitrogen Oxides	Other	Basis of Estimate

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